SOCIO-ECONOMIC FACTOR

Submission of

ONTARIO HYDRO

to the

Royal Commission

On Electric Power Planning

with respect to the

Public Information Hearings

1976

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4.1 Economic and Financial Factors

4.1.1 Provincial Economic Development

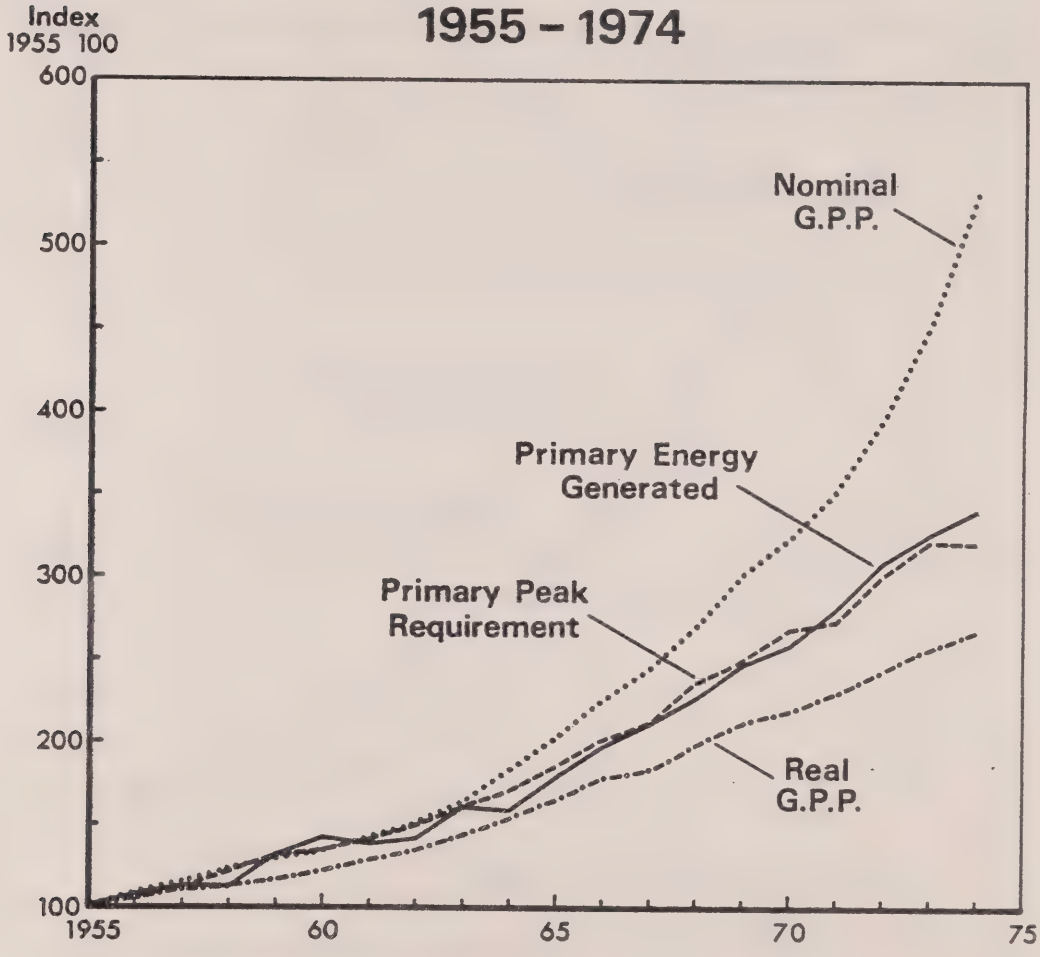
4.1.1.1 Historical Relationships Between Electrical Usage and Economic Development

In the past there have been identifiable trends in provincial energy usage - electricity usage specifically - and rates of economic growth. Between 1958 and 1973, total energy consumption in Ontario grew at an annual compound rate of almost 5 percent (Table 1). During the same period, primary peak electricity demand increased at a rate of 6.7 percent and annual energy usage at a rate of 7.2 percent. Since the mid-1950's, the growth in electricity usage has been consistently greater than the real growth in output of goods and services in the economy (see figure 1). Concurrent with these rates of relative growth, there has occurred a dramatic restructuring of the economy as growth in the service sector has consistently outstripped growth in other sectors (see figures 2 and 3). Employment in the service-producing sector in Ontario increased from 47.5 percent of total employment in 1951 to 61.7 percent in 1974. At the same time from the mid-1960's onwards, the average annual increase in per employee electricity usage has been growing at a rate of close to 6 percent in service sector industries - almost double that recorded in the manufacturing market segment.

Clearly, any changes in the historical relationship between economic development and the use of electricity will have far reaching implications. These may impact upon both the optimum future power system configuration and the growth and structure of the economy. Ontario Hydro, in planning the power system, is cognizant of these possibilities.

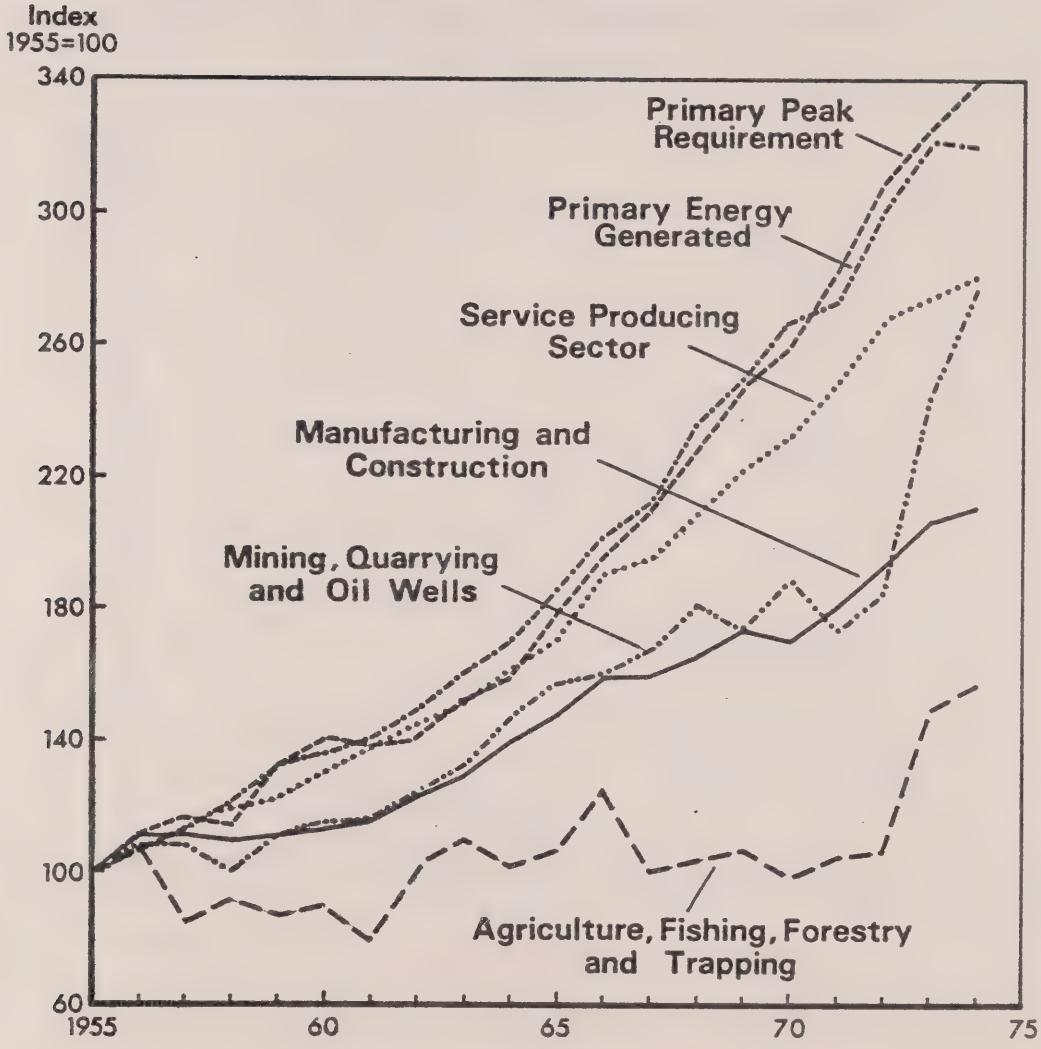
Figure 1

Gross Provincial Product, Primary Energy Generated and Primary Peak Requirements 1955 – 1974



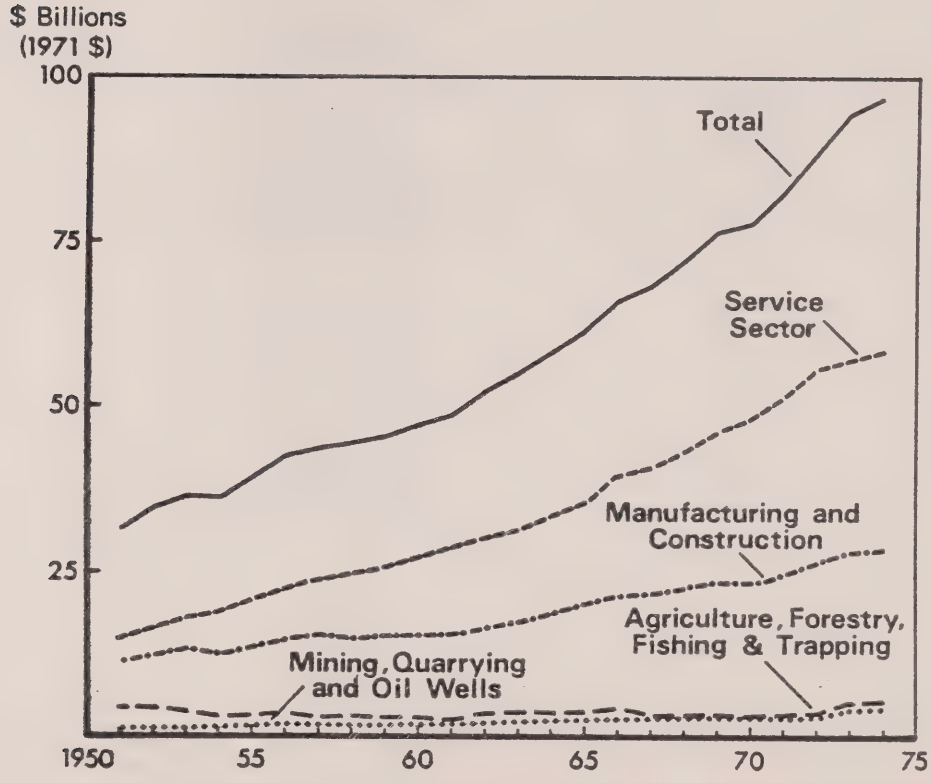
Source: Table 4

Figure 2
Real Gross Domestic Product Primary Energy Generated and Primary Peak Requirement



Source: Tables 2 and 4

Figure 3
Canada's Gross Domestic Product By Sector



Source: Table 2

TABLE 2

CANADA'S REAL GROSS DOMESTIC PRODUCT *
1951-1974 (1971 DOLLARS)
($'000,000)

Year	Agriculture, Forestry, Fishing and Trapping	Manufacturing and Construction	Mining, Quarrying and Oil Wells	Service Sector	Total
1951	4,727.9	11,177.0	1,334.4	15,036.1	32,275.4
2	4,450.5	12,309.3	1,318.0	16,655.3	34,733.1
3	3,930.8	13,152.5	1,141.5	18,033.1	36,257.9
4	3,024.8	12,696.6	1,376.2	18,919.4	36,017.0
5	3,381.5	13,569.2	1,661.5	20,818.6	39,430.8
6	3,600.9	14,913.9	1,808.6	22,195.9	42,519.3
7	2,905.5	15,258.7	1,800.9	23,752.9	43,718.0
8	3,121.8	14,886.8	1,671.9	24,869.6	44,550.1
9	2,923.8	15,110.8	1,838.0	25,594.2	45,466.8
1960	3,051.3	15,344.0	1,916.8	27,110.9	47,423.0
1	2,707.2	15,569.1	1,930.9	28,671.3	48,878.5
2	3,515.0	16,633.5	2,068.1	30,068.1	52,284.7
3	3,721.9	17,513.4	2,201.9	31,576.2	55,013.4
4	3,454.3	18,891.6	2,443.9	33,560.1	58,349.9
5	3,618.2	20,069.5	2,613.1	35,512.1	61,812.9
6	4,255.4	21,487.9	2,667.1	39,889.8	68,300.2
7	3,394.6	21,672.9	2,787.0	40,589.0	68,453.5
8	3,515.2	22,513.0	3,020.3	43,290.8	72,339.3
9	3,604.8	23,559.4	2,890.9	46,379.0	76,434.1
1970	3,329.2	23,069.1	3,137.3	48,304.4	77,840.0
1	3,530.0	24,480.0	2,886.0	51,677.0	82,573.0
2	3,615.8	26,291.7	3,059.1	55,712.9	88,679.5
3	5,059.8	28,042.2	4,055.4	57,201.4	94,358.8
4	5,306.8	28,612.1	4,592.7	58,379.4	96,891.0

* At factor cost - National Price Deflator is Used for all Industries.

Source: Statistics Canada, National Income and Expenditure Accounts

TABLE 3

MARKET SHARE OF REAL DOMESTIC PRODUCT 1951-1974
(Per Cent)

Year	Agriculture, Forestry, Fishing and Trapping	Manufacturing and Construction	Mining and Oil Wells	Service Sector	Total
1951	14.6	34.7	4.1	46.6	100
2	12.8	35.4	3.8	48.0	100
3	10.8	36.4	3.1	49.7	100
4	8.4	35.3	3.8	52.5	100
5	8.6	34.4	4.2	52.8	100
6	8.5	35.0	4.3	52.2	100
7	6.6	35.0	4.1	54.3	100
8	7.0	33.4	3.8	55.8	100
9	6.4	33.3	4.0	56.3	100
1960	6.4	32.4	4.0	57.2	100
1	5.5	31.8	4.0	58.7	100
2	6.7	31.8	4.0	57.5	100
3	6.8	31.8	4.0	57.4	100
4	6.0	32.3	4.2	57.5	100
5	5.9	32.4	4.2	57.5	100
6	6.4	32.5	4.0	57.1	100
7	5.0	31.6	4.1	59.3	100
8	4.9	31.1	4.2	59.8	100
9	4.7	30.8	3.8	60.7	100
1970	4.3	29.6	4.0	62.1	100
1	4.3	29.6	3.5	62.6	100
2	4.1	29.7	3.4	62.8	100
3	5.4	29.7	4.3	60.6	100
4	5.5	29.4	4.8	60.3	100

Source: Statistics Canada, National Income and Expenditure Accounts

TABLE 4

Gross Provincial Product and
Electricity Usage 1951-1974

Year	Nominal GPP ($000,000)	Real* GPP 1971=100 ($000,000)	% Change (Real GPP)	Primary Electricity Usage: Peak Requirement (MW)	% Change	Annual Energy Generated (Million kWh)	% Change
1951	8,440	13,836	-	3,110	-	14,026	-
2	9,189	14,425	4.3	3,282	5.5	15,272	8.9
3	9,905	15,574	8.0	3,488	6.3	16,263	6.5
4	10,045	15,550	-0.2	3,706	6.3	18,078	11.2
5	10,803	16,620	6.9	4,230	14.1	22,468	24.3
6	12,179	18,070	8.7	4,514	6.7	25,142	11.9
7	13,318	19,358	7.1	4,784	6.0	26,212	4.3
8	13,488	19,324	-0.2	5,139	7.4	25,643	-2.2
9	14,118	19,554	1.2	5,577	8.5	29,600	15.4
1960	14,638	20,302	3.8	5,758	3.2	31,713	7.1
1	15,360	21,215	4.5	5,952	3.4	31,101	-1.9
2	16,335	22,255	4.9	6,293	5.7	31,587	1.6
3	17,795	23,790	6.9	6,797	8.0	34,057	7.8
4	19,543	25,513	7.2	7,210	6.1	35,711	4.9
5	21,661	27,384	7.3	7,818	8.4	40,309	12.9
6	24,473	29,628	8.2	8,565	9.6	44,049	9.3
7	26,336	30,659	3.5	8,964	4.7	47,189	7.1
8	29,215	32,937	7.4	9,994	11.5	50,933	7.9
9	32,638	35,246	7.0	10,555	5.6	55,534	9.0
1970	35,314	36,444	3.4	11,289	7.0	58,253	4.9
1	38,128	38,128	4.6	11,534	2.2	63,131	8.4
2	42,657	40,664	6.7	12,739	10.4	69,366	9.9
3	48,802	42,921	5.6	13,606	6.8	73,196	5.5
4	57,344	44,315	3.2	13,538	-0.5	76,318	4.3
Average Growth Rate			5.2		6.6		7.8

* Based on Statistics Canada National Price Deflator

Source: Various Issues of Ontario Hydro Statistical Yearbook, Chairman's Statistical Report, and Ontario Statistics, 1975

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4.1.1.2 Ontario Hydro as a User of Limited Human, Material and Capital Resources

As a purchaser of scarce human, material and financial resources in the economy, Ontario Hydro actively competes in the marketplace and relies upon relative prices to reflect society's priorities. The market mechanism provides an indication of the extent to which society in general is willing to see resources consumed in the production of electricity rather than in some alternative application. Thus, the price of electricity will influence electrical usage in the province which in turn determines the quantity of resources allocated to its production. The relative prices of resources consumed in the production process will determine the mix of resources actually utilized.

Expenditures by Ontario Hydro upon labour inputs and goods and services contribute through direct, indirect and induced multiplier effects to the stimulation and growth of the Ontario economy. To the extent that many of these expenditures are concentrated in high technology pursuits, the particular industries involved will be especially stimulated. Every dollar spent upon wages and salaries represents a direct addition to gross provincial product with a subsequent indirect impact to the extent that a proportion of this amount is respent in the economy, that is, they have a multiplier effect.

Various input-output systems are currently available for the estimation of multipliers at both the national and provincial levels. For present purposes, reference will be made to the Ontario Interindustry Model (1965), keeping in mind that the relevant 'utilities sector' in this model includes not only electric power, but also water systems, gas distribution and other utilities(1). Although highly aggregative, it may be useful to briefly summarize the resultant income and employment multiplier impacts on the Ontario economy, as they apply to utilities.

Three types of multipliers are distinguished. Multipliers A and B reflect income generated by the total production requirements of one dollar's worth of output of the utility sector and total repercussions of the initial change, respectively. The difference, B minus A, is referred to as the induced effect - multiplier C.

Given a billion dollar ($1B) increase in expenditures on the part of the utility industry, the indirect and direct effects on total income and employment (income from

Simple and Induced Income and Employment Multipliers[1] - Ontario

Industry	Value[2] Added	Wage Value Added	Multipliers[3] Income A	Income B	Income C	Employment A	Employment B	Employment C
Utilities	.66	.18	1.05	2.97	1.92	1.23	4.51	3.28
Others	.42	.22	3.82	6.23	2.41	2.04	5.59	3.55

(1) Based on Results in: A. Kubursi and R. Frank, "Sectoral Characteristics of the Ontario Structure of Production", in Ontario Economic Review, Special Supplement, March 1972, Department of Treasury and Economics, Ontario Government.

(2) Value Added and Wage Value Added are measured per dollar's worth of output.

(3) In general, Multiplier "A" Measures Direct + Indirect Effects, Multiplier "B" Direct + Indirect + Induced Effects and Multiplier "C", induced effects.

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employment is used rather than man-hours) total $1.05B and $1.23B, respectively. Compared with all other industries, included in the aforementioned analysis, these magnitudes rank below the provincial average - 5th and 7th lowest out of a total of 49. On the same basis, when induced effects (multiplier C) are taken into consideration, the overall income and employment multipliers (multiplier B) increase to $2.97B and $4.51B respectively.

In 1975, Ontario Hydro was responsible for capital expenditures of $1,429.4 million and operating expenditures of $915.8 million. If direct, indirect and induced multipliers are assumed to prevail of the magnitude described, and assuming that 65 percent of these expenditures are made within Ontario, then the total income effect in the province was in the order of $4.5 billion - approximately 8 percent of Gross Provincial Product in 1974.

4.1.1.3 Ontario Hydro as the Supplier of an Essential Factor of Production to Industry

While expenditures upon electricity inputs accounted for 44.2 per cent of total energy expenditures by Ontario manufacturing industries in 1972, (the most recent year for which figures are available) electricity costs - even for the electricity intensive users - are a relatively small proportion of total input costs (see Tables 6 and 7)(2). Electricity inputs per thousand dollars of value added for the nine most electricity intensive industries were on average $73.6 (i.e. 7.36 per cent of value added in these industries). While these same nine industries accounted for 47 per cent of the total volume of electricity consumed, they accounted for only a small proportion - 8.7 per cent - of total value added in manufacturing. In addition, they employed only 7 per cent of the total number of employees in Ontario Manufacturing.

The amount spent upon electricity by all Ontario manufacturing industry, in 1972, averaged 1.7 per cent of the total value added in manufacturing.

TABLE 5

Electricity Costs of the Twenty Largest Manufacturing Industries in Ontario - 1972

	S.I.C. No's	Value Added in Mfg. (million) $	Amount Spent on Electricity Per $000 Value Added $	Per Person Employed $	Per $000 Shipments $
1. Motor Vehicle Parts and Accessories	325	847.1	12.69	241.26	5.76
2. Motor Vehicle Mfgs.	323	802.9	7.99	185.18	1.77
3. Iron and Steel Mills	291	778.3	35.01	739.81	17.95
4. Miscellaneous Machinery and Equip.	315	480.4	7.56	107.74	3.61
5. Beverage Industries	109	459.0	4.55	197.10	3.08
6. Pulp and Paper Mills	271	355.7	84.56	1,480.77	38.65
7. Misc. Food Industries	108	322.9	10.16	241.07	4.27
8. Rubber Products Ind.	162	297.4	13.76	266.38	7.81
9. Communications Equip. Manufacturing	335	295.7	5.69	80.22	3.48
10. Metal Stamping, Pressing & Coating Ind.	304	292.2	10.41	172.37	4.63
11. Comm. Printing	286	284.7	6.28	82.01	3.82
12. Industrial Chemicals	378	281.4	79.92	2,064.92	37.13
13. Publishing & Printing	289	251.8	5.22	91.83	3.99
14. Electrical Industrial Equipment	336	242.2	8.93	124.76	5.24
15. Scientific and Professional Equip.	391	202.0	6.65	103.20	4.13
16. Misc. Metal Fabricating Inc.	309	198.6	11.06	160.29	5.57
17. Plastics Fab. Inc., n.e.s.	165	197.4	18.05	241.44	9.28
18. Meat & Poultry Prod. Ind.	101	186.6	12.34	164.51	2.25
19. Pharmaceuticals & Medicines	374	173.7	4.62	110.77	3.27
20. Wire & Wire Products Manufacturing	305	167.2	12.97	196.16	6.12
Total		7,117.2			
Ontario Manufacturing Ind. Average			16.88	275.78	7.43

Source: Ontario Government, Ministry of Treasury, Economics and Intergovernmental Affairs, Consumption of Fuel and Electricity by Ontario Manufacturing Industry - 1972, May 1975.

TABLE 6

Ontario's Electricity Intensive Industries - 1972

	Value Added in Mfg. ($Million)	Electricity Cost Per $000 of Value Added ($)	Volume of Electricity Used (kWh 000)	Electricity Cost Per Person Employed ($)	Number of Employees	Average Annual Wage ($)
Pulp & Paper Mills	355.7	84.56	4,304,856	1,481	20,310	9,661
Industrial Chemicals	281.4	79.92	3,219,553	2,065	10,889	11,354
Petroleum Refineries	158.8	44.32	907,419	2,662	2,644	13,112
Smelting & Refining	135.0	73.05	1,416,387	884	11,155	9,835
Iron Foundries	96.1	38.82	304,818	557	6,696	9,030
Cement	56.0	64.09	456,549	3,067	1,171	10,218
Abrasives	28.7	188.33	858,700	2,712	1,992	9,156
Lime	6.6	54.24	41,305	1,002	357	8,346
Miscellaneous Petroleum and Coal Products	2.9	35.20	5,741	533	193	9,446
Totals	1,121.2		11,515,328		55,407	
Ontario Manufacturing Industrial Average	114.9	16.88	218,451	276	7,034	8,386
Percent of Ontario Manufacturing Industrial Total	8.7		47.0		7.0	

Source: Ontario Government, Ministry of Treasury, Economics and Intergovernmental Affairs, Consumption of Fuel and Electricity by Ontario Manufacturing Industry - 1972, May 1975.

TABLE 7

Electricity - 10 Largest Users in Ontario - 1972

	S.I.C. No's	Amount Used $Million	% of Total Mfg. Use	Electricity Use as a % of Total Energy Consumption for each Industry	Per $000 of Value Added	Per Person Employed	Per $000 Shipments
Pulp and Paper Mills	271	30.1	13.8	48.55	84.56	1,480.77	38.65
Iron and Steel Mills	291	27.3	12.5	50.73	35.01	739.81	17.95
Industrial Chemicals	378	22.5	10.3	39.40	79.92	2,064.92	37.13
Motor Vehicle Parts and Accessories	325	10.8	4.9	53.55	12.69	241.26	5.76
Smelting & Refining	295	9.9	4.5	33.51	73.05	884.36	47.81
Petroleum Refinements	365	7.0	3.2	78.93	44.32	2,661.63	9.65
Motor Vehicle Mfg.	323	6.4	3.0	45.33	7.99	185.18	1.77
Abrasives Mfg.	357	5.4	2.5	94.65	188.33	2,711.53	88.47
Rubber Products Ind.	162	4.1	1.9	51.09	13.76	266.38	7.81
Man-made Fibre Yarns and Cloth Mills	183	3.8	1.7	49.49	28.78	399.64	14.09
Total		127.3	58.3				
Ontario Manufacturing Average				44.18	16.88	275.78	7.43

Source: Ontario Government, Ministry of Treasury, Economics and Intergovernmental Affairs, Consumption of Fuel and Electricity by Ontario Manufacturing Industry - 1972, May 1975.

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4.1.2 Economic Evaluations

4.1.2.1 Selection of the Best Alternative (3),(4)

In the financial and economic areas, Ontario Hydro's long range planning is concerned with its internal economic efficiency, its impact on the external economy, and its ability to finance expansion.

The objectives governing financial and economic concerns are included in the decision process by means of:

- restrictions (also referred to as constraints);
- rankings of alternatives based on differences among them; and
- trade-offs with other objectives.

Generally speaking, restrictions put absolute limits on the degree to which economic efficiency objectives may be pursued at the expense of other concerns such as safety and appearance. They may be imposed internally (for instance, design standards) or externally (for instance, specific government emission-related regulations).

In view of expected difficulties in financing system expansion, constraints have been placed on alternatives having high capital cost. This restriction may prevent economic efficiency from being as high as could be achieved if high capital cost alternatives could be implemented.

The ranking of alternatives in terms of differences in internal economic efficiency is done by the discounted cash flow cost comparison. Rankings with respect to differences in impact on the general economy are obtained by the analysis of social costs and benefits described in Section 4.1.3. Rankings with respect to financial objectives are not required since, apart from the capital restriction mentioned above, financial objectives are achieved by actions which are independent of the selection of specific alternatives. That is to say, provided the alternatives meet the capital restriction, such measures as system expansion charge adjustments and rate smoothing will achieve financial objectives regardless of the alternative selected.

Alternatives may not show the same ranking for economic efficiency as for impact on the general economy. In such cases, selection of the best alternative is accomplished by

trading off the advantages of one alternative in one area against the advantages of another alternative in a different area, taking account of the relative importance of the areas.

While economic differences can be quantified, many other differences cannot. As a result the trade-off process requires considerable judgement. Control of this judgement is obtained by corporate review of proposals before major alternatives are committed for design and construction.

4.1.2.2 Economic Efficiency and Economic Costs

Economic efficiency is a relative term and for the purpose of this report, is measured by the value of the physical output of a process divided by the net cost of resource inputs to that process. The net cost is the gross cost minus any receipts from the sale of by-products.

Economic cost comparisons are used to determine differences in the net cost of resource inputs. For these comparisons, estimates are made of the amount and timing of payments by Ontario Hydro for the acquisition of all the resources required to carry out each alternative. Differences in the pattern of the year-by-year payments are accounted for in the comparison by discounting the payments to a common point in time, using a discount rate appropriate to the corporation as a whole.

The estimated payments have the following characteristics:

(a) They represent what is considered most likely to occur. An allowance is therefore included for the estimated escalation of wages and prices. The possibility of error is recognized and may be included in the comparison by sensitivity analysis.

(b) They include only costs that can be influenced by the decision. Past (sunk) costs and common costs are therefore not included.

(c) They are costs to Ontario Hydro for the acquisition of all resources from the economy. Expected allocations of these costs to the cost of power and internal charges are therefore, not relevant. Interest payments associated with borrowed funds are also not included because the cost of borrowing is an indicator of the time-related value of resources and is therefore taken into account through the discounting process. Simplifications and approximations are used

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whenever this can be done without invalidating the comparison.

4.1.2.3 Methods of Treating Certain Factors Entering Into Economic Evaluations

Discount Rate

At the present time, the discount rate is based upon the anticipated Ontario Hydro long term borrowing cost. The discount rate is periodically reviewed in the light of current economic forecasts and revised as necessary.

Life Expectancy

The point at which physical plant must be retired from service and replaced with other facilities is important in economic cost comparisons. This is because it determines when payments must be made for replacements and it plays a part in determining the future period during which costs can be influenced by a current decision. Life expectancy depends on physical deterioration and technological obsolescence. It does not depend upon accounting cost allocation considerations (i.e., not upon depreciation periods used for accounting purposes).

Escalation and Inflation

To ensure that estimated cash flows are realistic, escalation forecasts are applied to cost estimates. These forecasts are prepared annually, or more often as warranted by changing forecasts of economic conditions.

Interim Replacements

The costs for replacing or rehabilitating some components of generation plant prior to the end of its useful life should theoretically be included in the cost of generation alternatives. Generally, in Ontario Hydro studies, these costs are not included because they do not significantly affect total costs.

Insurance

Insurance carried by Ontario Hydro includes construction insurance covering Ontario Hydro and contractors against liability arising from accidents during construction, and insurance covering damage to some major system components. Generally, in Ontario Hydro studies, these costs are not included because they are not significant in relation to total costs.

Public liability insurance for nuclear plants is presently carried by AECL and hence has not entered into past alternative generation comparisons since it did not

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represent a payment for resource acquisition by Ontario Hydro. This situation is expected to change upon passage of Bill C 158 (Nuclear Liability Act). Ontario Hydro is presently negotiating with the government and insurance carriers to determine the charges.

Taxes

Ontario Hydro is not subject to federal and provincial income taxes. In this area, Ontario Hydro's economic cost comparisons differ from those carried out in private industry, where tax credits resulting from payments associated with the acquisition of resources are a major concern. Other payments to governments, when applicable to Ontario Hydro are included in the evaluation procedure.

Operations and Maintenance Costs

These are resource acquisition costs and where they are significant they are included in economic comparisons. They include both direct costs and allowances for overheads which vary in proportion to them, such as sickness, accidents, and vacation and holiday benefits.

Inventories

Inventories influence economic costs by causing a difference between the time of acquisition of the resource and the time of the use of a resource by Ontario Hydro. Approximations such as average costs may be used as the cost of items drawn from inventory.

Commissioning Costs and Energy Credits

Since all significant costs must be included in an economic cost comparison, Commissioning costs, which represent payments for resources acquired by Ontario Hydro, form part of alternative economic comparisons. Where appropriate, the net commissioning costs include credits for the energy supplied to the electrical system during the commissioning phase, because this reduces the energy that must be supplied by the remainder of the system.

Overheads

Overhead costs are costs such as administration and supervision which are only partly affected by direct costs such as construction labour. Insofar as they are not directly related to a choice between alternatives they are treated as common costs. Forecasts of the portion of overhead costs which will be directly affected by a choice between alternatives are applied as percentages to

operation and maintenance costs. Overhead costs are also included in initial facility costs.

Equivalent Uniform Annual Costs (EUAC)

These are equal yearly amounts having the same present worth when discounted as the cash flow payments associated with an alternative. They are occasionally used to compare projects having different economic lives when like-for-like replacement is expected. However, their use is usually avoided in comparisons of major facilities because of the potential for confusion with allocated costs.

Sale of By-Products

Differences in receipts from the sale of by-products are a factor in economic efficiency, but they are ignored in studies if they are not significant in comparisons with total costs. For this reason, a simplifying assumption is made that the cost of dismantling generating plant at the end of its life will be equal to inflows from its sale as salvage.

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Risk (Sensitivity Analysis)

Since cost estimates must be realistic, forecast cash flows associated with resource acquisition are based on the "most likely" estimate, i.e., that which has the highest probability of occurence.

Sensitivity analysis is a technique which is used to identify those key factors which are the principal contributors to the risk that an inferior alternative will be chosen. In this technique the estimates which have the greatest impact on the comparison are identified, usually by changing each one in turn by a given proportion, e.g. 10%. Then the effect on the comparison of varying these estimates through a range of values (e.g. from a minimum to a maximum) based on possible inaccuracies in forecasts and assumptions is investigated. Those estimates that significantly change the comparison when varied through this range of possible values are candidates for additional estimating effort directed toward reducing the range. In addition, the discount rate is varied to determine whether comparisons are valid under a wide range of economic conditions.

Heavy Water Costs

Acquisition costs of heavy water are included in the initial costs of nuclear generation facilities. Using the simplifying assumptions associated with the acquisition of items from inventory, the average cost at the time of facility construction is used.

4.1.2.4 Economic Efficiency and Cost Allocation

Factors used to evaluate Economic Efficiency are generally different from those used for Cost Allocation, i.e., for establishing the cost of power. The objectives and the factors taken into account in cost allocation, as compared to economic efficiency, are described here.

Briefly, the objectives of the cost allocation system are:

(a) to obtain funds at minimum cost;

(b) to allocate costs equitably between classes of customers;

(c) to allocate costs equitably between present and future customers; and

(d) to avoid sharp year to year variations in rates.

The manner in which payments resulting from implementation of alternative plans for system expansion will be allocated to the cost of power, is not a matter of concern when alternatives are being compared. At the comparison stage the emphasis is on minimizing the payments themselves, that is, on economic efficiency. If it is concluded that this emphasis will make the achievement of financial objectives difficult a suitable restriction is imposed. The restriction on high capital alternatives is an example.

4.1.2.5 Differences Between Incurred and Allocated Costs

Use of the same terminology for both incurred and allocated costs sometimes leads to misunderstanding of intent. Some examples are:

(a) Interest

In economic cost comparisons the term "interest rate" is sometimes used interchangeably with "discount rate" to identify the time-related value of resources. In cost of power allocations "interest rate" refers to interest on borrowing. The two are only indirectly related. At any given time there is only one time-related value of resources appropriate to Ontario Hydro as a whole. On the other hand, at any given time interest charges to be allocated to the cost of power are the result of a great many different interest rates.

(b) Depreciation

When referred to in economic cost comparisons depreciation identifies the loss of value of an asset. Depreciation leads to economic costs for replacements or repairs but is not in itself a cost. Depreciation charges under the cost allocation system, on the other hand, are used to recover the original cost of an asset in a manner consistent with financial policy.

(c) Overheads

Overheads in economic cost comparisons are indirect costs such as management and legal costs which will be influenced by the choice of alternative. Because indirect costs tend to be almost the same, regardless

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of the alternative chosen, overheads are seldom a significant cost comparison factor. Overheads in cost allocation usage are also indirect costs but since all costs must be recovered, regardless of whether they will be different, they can be much more significant in this context.

(d) Annual Costs

Expected incurred costs are sometimes, for economic comparison purposes, converted to equivalent uniform annual costs using the discount rate to take timing differences into account. Such costs are never the same in amount and timing as the annual cost allocations that will be made in order to recover capital costs, and only the same as the annual cost allocations for expenses when there is no significant escalation.

(e) Capital Cost of Nuclear Fuel

For economic cost comparisons the cost of nuclear fuel is taken into account by estimating the time and amount of payments for acquisition of the fuel from suppliers. No allowance is made for the value of spent fuel. For cost allocation purposes, one half of the cost of the initial charge of fuel is allocated as a part of the capital cost of the nuclear plant. All other nuclear fuel costs are identified as expenses. The pattern of the costs used for economic cost comparisons and for allocation will therefore, be quite different.

4.1.3 Social Costs and Benefits

4.1.3.1. General Discussion

An organization's activities may impose costs and confer benefits upon society at large, over and above the costs and benefits normally identified in the organization's accounting statements. The efficient allocation of resources and the maximization of consumer welfare requires that total costs and benefits enter into the economic evaluation procedure.

The most efficient level of operation for any particular type of productive activity can be defined as that level of production where incremental social costs exactly equal incremental social benefits. The social welfare function, which determines the point at which incremental social costs and benefits will be equal, will depend upon the

values and insights which society places upon such factors as economic growth, equality of income distribution, and quality of life, however defined.

4.1.3.2 Defining Social Cost

There is a wide range of interpretation put upon this term, however, for present purposes social costs are defined as all of those costs resulting from a productive activity which are borne by society as a whole. Thus, they consist of the direct costs of resources utilized in the activity, together with the value of any loss in welfare, or increase in costs, which that activity inflicts upon any other individual or entity in the economy.

For instance, the social costs of generating electricity from fossil fuels are the costs incurred directly by the utility plus any associated costs that are imposed upon society (e.g., through increased air pollution building deterioration may accelerate, or building maintenance costs may increase).

4.1.3.3. Defining Social Benefits

Similarly, for these purposes social benefits are all of the gains in welfare which flow from a particular activity, whether or not they accrue to the individual or institution undertaking the activity. They comprise the total improvement in welfare of the society as a whole, including the group undertaking the activity.

For instance, Ontario Hydro receives benefits in the form of revenues from the sale of electricity. However, total social benefits will exceed these benefits to the extent that electricity provides a needed form of energy to individuals and industry, to the extent that industry and technology are stimulated in the provincial economy, and to the extent that income and employment are increased as the result.

4.1.3.4 External Costs and Benefits

Externalities associated with Ontario Hydro operations are those costs and benefits experienced by society which are not internalized within Ontario Hydro's financial statements or operating calculations. Costs may include detrimental impacts upon the environment, while benefits would include stimulation of high technology industry and benefits associated with a secure electrical supply.

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4.1.3.5 Opportunity for Quantification of Externalities

To varying degrees, external costs and benefits associated with the operations of Ontario Hydro are incapable of quantification and, therefore, difficult to include in any decision-making evaluation. For example, external costs associated with aesthetics are intangible, evaluation of losses in welfare as a result of increased pollution are to a large extent subjective. The exact nature of the benefits conferred upon society as a result of income, employment and technological multipliers and the quality of life in general are equally difficult to evaluate.

It is, therefore, important that care be taken to guard against giving undue weight to quantified impacts as some of the qualitative matters may be of greater significance.

A great many of the benefits which may be attributed to Ontario Hydro's facilities result from the provision of electricity to the province as a whole. These benefits range from comfort (heating and cooling) to a change in employment opportunities (increases in productivity through the use of computers and other electrically operated equipment). An examination of the social benefits which flow from electrical generation and transmission facilities must also recognize the extent to which electricity aids in the abatement of a variety of pollutants. In this way the generation of electricity may in fact result in lower absolute levels of pollution.

Unlike external social benefits, the external social costs attributed to electrical generation and transmission facilities conform with those usually assigned to any major facility. Specifically, external social costs include air and water pollution, solid wastes, land disruption, occupational health or safety and aesthetic degradation.

Social assessments undertaken for Ontario Hydro are currently in progress to examine the causes of negative social impacts and the costs associated with these with respect to the construction of facilities. These assessments constitute an attempt to identify all of the costs associated with the additions of facilities in order to provide for the construction of facilities having the least total costs - thereby increasing the net benefits to Ontario residents.

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4.1.4 Economic Forecast (5),(6)

Capital expenditure forecasts and economic evaluations in general require that projections be made of the expected escalation in prices of major inputs to the system expansion program and day-to-day operations.

4.1.4.1 Escalation and Inflation: Methodology

Forecasts of future escalation and inflation are summarized in the "Economic Forecasting Series". The methodology applied to produce this series has been developed in an evolutionary process. Forecasts produced before 1972 generally predicted varying escalation rates for three to four years, followed by the long-term trend of the historic series. As escalation intensified during the 1973-74 period, more effort was made to forecast the future. With the economic forecasting systems now in use and under development, Ontario Hydro should be in a better position to estimate projected future costs.

It should be noted that the methodology described below is an iterative process. It is established to produce an end result in a form desired by various users, and this form is continuously changing. Between successive forecasts, internal and external contacts are made and interpretations of events relative to their specific areas are received. Meetings are held from time to time with major users, to discuss the data, format and the forecasting techniques.

In general, the variability of any forecast increases as one is trying to forecast further ahead in time. Compounding this situation are the frequently abrupt and often unpredictable decisions and events encountered in today's economy. This can have a much more significant effect on cost and price forecasts in the short run than errors in predictions of longer term trends.

In decisions on long range planning, the correctness of relativities between projected future costs and prices are more important than are the absolute figures shown for the indivual categories.

The Economic Forecasting Series is developed and produced in a number of steps.

4.1.4.2 Data Collection and Mathematical Manipulation

Various types of data are collected by the Office of the Chief Economist and other Ontario Hydro groups. These form inputs to the forecasting process. Some of this data (mostly Statistics Canada historic indexes) is regularly

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added to a Forecasting computer data file for later manipulation. The types of data could be categorized as follows:

(a) Historic records and indexes, either developed internally or published by outside sources.

(b) Opinions, advice and conclusions of internal and external "experts" in all pertinent areas (labour, fuel, materials, commodities, manpower, foreign exchange, economic indicators, etc.)

(c) Various economic publications, articles and news reports.

(d) Econometric models.

The assimilation of this data is not currently a fully formalized process. Generally speaking only internal cost records and certain externally published indexes are recorded in series form for future use. All other data is retained either in its originally published form or mentally by the people concerned. In an effort to relieve this problem and with an end objective of being able to provide "immediate" retrieval of economic data, an Economic Information Unit is under development. Here all background material for forecasts will be stored as well as common economic data needed by the rest of the Ontario Hydro Organization.

The Information Unit uses Cansim, a Statistics Canada computer data bank which contains thousands of time series. This usage is through a remote terminal on external time sharing computer services, from which instant retrieval is possible. Further, the Information Unit is endeavouring to physically maintain other economic information which is required on a high priority repetitive basis by the Economics Division of Ontario Hydro.

The output and use of the econometric model, Candide, is used to provide a mathematical projection of important economic variables. This is a large, comprehensive model, and is one of the few which project beyond 1 or 2 years. The service company marketing it also arranges semi-annual user meetings to discuss assumptions built into the model, and modifications are made to reflect the group's consensus views. These meetings also provide very useful opportunities for establishing contacts with other private and public sector practicing forecasters.

Efforts have been made to establish contacts with other large utilities for the purposes of exchanging information

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on forecasting techniques and data. Regular contact is made with such companies as Quebec Hydro, Manitoba Hydro, B.C. Hydro, AECL and Bell Canada. Other contacts are now on an "as need develops" basis.

Each forecast category has a "Historic Data Base and Composition" listed. These are descriptions of the historical data series which make up the categories, and should reflect the actual movements in them. Most component parts of each "data base" are on the computer data files for use in later manipulations.

Mathematical projections are produced for all the historic data base series. Two curve fitting techniques are utilized, with the calculations being performed on the computer. The computer programs were produced by The Economist in Charge of Load Forecasts and are the same ones used in deriving the Load Forecast. The projection methodology is described below:

(a) Least Squares Technique - produces a forecast rate of change per year based on an equal weighting to each piece of historical information regardless of its date of occurrence. Such a projection represents a long-term growth rate.

(b) Exponential Smoothing Technique - produces a projected rate of change based on applying more weight to recent data than to older data in the series. This projection represents a short-term growth rate.

Further, 3, 5 and 10 year compound average rates are calculated for each series.

4.1.4.3 Data Interpretation and the Economic Outlook

Data collected and manipulated undergoes subjective analysis leading to a variety of projections regarding the future. The outlook is then developed on a "most probable" basis, that is, the one which is felt more likely to transpire than any other scenario of events. Most major economic variables are considered in this process, with the analysis effort first considering the international situation, followed by the national, provincial and special industry sectors.

4.1.4.4 Interpretation of the Economic Outlook and Data into Forecas

The economic outlook developed is summarized and presented to an Advisory Committee, consisting of members from

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Comptrollers, Fuels, Generation Projects, Labour Relations, Stations Projects, Supply and Treasury Divisions. Here, the assumptions and the implications from specific Divisions of Ontario Hydro, are discussed and additional data requirements identified. Additional forecast inputs are provided by group members when required.

At this stage of the process all information thus far produced is utilized along with additional, more detailed local data related to the specific functions within the Corporation. The new data inputs relate to the specific cost categories, rather than the general variables considered in the assumptions. For example, the assumptions define industrial wage rate trends in general, but the forecast must reflect the movement of Ontario Hydro's wage rates. These will be influenced by such factors as the union contract, Ontario's employment situation and Ontario Hydro's wage policies. Interpretation of all information leads to the series of figures published.

4.1.4.5 Fuel Costing Forecasting

Introduction

Due to the recent massive changes in primary fuel markets, forecasting of fuel costs using simple mathematical projections is no longer valid. The present procedure, therefore, has a large judgemental input taking advantage of as much hard data as is available. The underlying emphasis is to achieve a disciplined approach to assessing the most probable fuel cost levels as they will apply to Ontario Hydro.

Source Data

Background data is assembled by the Fuels Division staff throughout the year from the following sources:

(a) Main Sources

i) Actual prices paid under existing contracts for fuel, transportation, storage, etc.

ii) Estimates of future prices from negotiations of future contracts with particular emphasis on market conditions and fuel characteristics.

iii) Liaison with and data resources of Energy Boards and Regulatory authorities.

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iv) Discussions with vendors and knowledgeable individuals in industry, universities and government.

(b) Subsidiary Sources

i) Trade Publications and selected press intelligence.

ii) Technical Papers published in professional journals.

iii) Policy statements by government leaders.

iv) Attendance at Conferences and Seminars on energy economics.

v) Analysis of the effects of relevant Union negotiations.

(c) Trends in the Economy

The above sources are augmented by consultation with the staff of the Office of the Chief Economist on general trends in the economy, including economic projections produced by this group. In particular, the inflation figures used in the forecast are obtained from this source.

(d) Calculations

Expected future costs to Ontario Hydro are calculated on the basis of:

- existing prices;
- key assumptions which reflect the most probable future based on current judgement of developments in fuel markets and technology; and
- the inflation figures mentioned above.

Detailed calculations are carried out for periods of up to 10 years, depending on the fuel. Beyond these time periods the uncertainties become so great that they preclude any attempt at accurate, individual fuel-cost forecasts. Therefore, to ensure that fuel-cost forecasts are consistent with the projection of other cost elements and to maintain the underlying assumption of relativity, a simple annual percentage increase, keyed to the long-term inflation rate, is used across the board.

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The results of all calculations are assessed within the Fuels Division for mutual consistency and adjusted where necessary.

The Ontario Hydro forecast and those of external authorities are compared, usually on a non-formal basis. Any differences are examined and modifications made if warranted.

Finally, a forecast is prepared which details the basic assumptions and highlights any significant changes in the fuels area. It is then issued. In addition, the Office of the Chief Economist converts the data contained in this forecast to an index basis and issues them as part of the Economic Forecasting Series.

4.1.4.6 Interest Rate Forecast

Methodology

Ontario Hydro prepares an interest rate forecast quarterly. The interest rate forecast details the expected cost of the funds to be borrowed by Ontario Hydro in the Canadian, United States and other capital markets. The forecast is based on an assessment of expected capital market conditions over the period given Ontario Hydro's capital requirements. The factors considered in the preparation of the forecast include the following:

- the business cycle phase in Canada
- levels of Canadian unemployment and inflation
- Canadian monetary and fiscal policy
- potential needs of other Canadian borrowers
- savings patterns in Canada: structural changes
- government regulations affecting interest rates or flows of funds
- factors similar to the above for the United States economy
- Central Bank views and regulations concerning foreign borrowings
- foreign exchange holdings in Canada and major lending countries.

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- availability of foreign markets, including interest and exchange rates.

The resulting forecast of general interest rates is adjusted to produce the forecast of Ontario Hydro's borrowing cost. These adjustments take account of the particular characteristics of Ontario Hydro's debt issues such as the flexibility in timing, the mix of long and intermediate term bonds, and the use of international bond markets.

Variability of Interest Rate Forecasts

Interest rates are determined by the interrelationships between many diverse factors, and forecasts must be developed with all of these in mind. Political, economic and social factors can change suddenly and these changing conditions can necessitate revisions in the forecast. Generally, the longer the period under consideration the greater will be the chance of variation of the forecast from actual experience. While it is possible that interest rate forecasts can be accurate for the first year to within plus or minus 1/2 to 1%, beyond that period the potential variation can be wider and extremely difficult to quantify.

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4.1.5 Capital Expenditure Forecasts

Expenditure forecasts for current and future years are prepared on a regular basis. These forecasts are based on the capital construction program and other minor capital items such as office furniture and equipment, service equipment, transport and work equipment. The capital construction program accounts for 98% of the forecast expenditures and includes generation plants, transformer stations, transmission lines and other facilities necessary for the power system, as well as capital programs associated with the Ontario Hydro retail system.

The expenditure forecasts serve the following purposes:

- Forecast the potential demand for funds and thus help in determining borrowing requirements.
- Assist in the determination of revenue requirements.
- Contribute to the evaluation of alternative system expansion programs.
- Provide expenditure progress reports on construction underway.

4.1.5.1 The Process (7)

At any one time, the Ontario Hydro capital construction program includes a number of construction projects at various stages of commitment. Many projects are currently underway and in various stages of construction. Other projects have been formally approved and are scheduled to start in the future. Still others are in the planning stage, subject to further review, before they are formally committed.

The flow of information into the on-going capital construction program follows a general pattern. It starts with the Engineering Branch and Region planning personnel who are the Committing Authorities responsible for determining the basic requirements of a plan; for considering alternatives; for selecting the appropriate plan and determining the timing for formal release and completion so that the facilities will be available when required. These Committing Authorities prepare the planning schedules for future projects which are needed to meet the power system requirements. These future plans and their estimated

costs are the first step in the capital forecasting cycle. Subsequently, the Committing Authorities review the plans, make changes if necessary, and then arrange for the formal release of the projects. Release of a project gives formal commitment to it, including the estimated cost and expected in-service date. It also establishes the Controlling Authority which is one of the design, construction or operations groups. The Controlling Authority prepares more detailed plans of the project and its estimated cost and is responsible for executing the work, controlling the costs, meeting the timing schedules and securing the necessary approval for variances between the estimated and actual costs. During the construction stage, the actual costs flow into the job costing system and form part of the capital expenditure forecasting data.

The capital expenditure forecasts are based on approximately 1,700 planning schedules and 2,000 active projects which are in various stages of activity at any one time. The records are retained in a computerized Capital Construction Program Forecasting and Reporting System (CAPFOR), which processes the documents, produces information to monitor the system and provides expenditure forecasts. The capital expenditure forecast process comprises both short range, generally 5 years, and long range forecasts.

4.1.5.2 Short Range Forecasting

The short range forecasts of capital expenditure requirements are based on the on-going capital construction program projects and the forecast of future system development. The records are stored in the computerized CAPFOR system. The capital forecasts are assembled in the following major categories.

(a) Generation Projects

The capital expenditures forecast comprises the cash flows for the major generation plants and heavy water production facilities under construction and the plans which are included in the future generation development program. The forecast also includes minor miscellaneous capital improvements at existing generating plants.

(b) Stations Projects

A portion of the future plans for the Stations Projects that are recorded in the CAPFOR system are subject to uncertainty. Prior to producing a particular forecast, the plans are reviewed with Engineering staff and the forecast is adjusted for deferments, modifications or possible eliminations. The latter years of the forecast do not contain sufficient detail for the minor projects and must be augmented by data based on historic information, current trends and the overall system expansion program.

(c) Transmission and Distribution Projects

The forecasts for this category are developed in exactly the same way as those for the Stations Projects.

(d) Regions

The Region capital expenditure forecasts are obtained from the Region Program Budget submissions.

(e) Heavy Water

The forecasts are based on the Heavy Water expenditures provided by the Thermal Generation Division.

(f) Miscellaneous

The miscellaneous category includes capital construction expenditures by other groups who have minor involvement in the capital construction program. The same basic procedure is followed as with the Station Projects and Transmission and Distribution projects. In these instances, less information is available for future periods. Therefore, future periods are generally projections of historic data and current trends.

(g) Other Classes of Capital

The capital expenditure forecasts for this category cover the non-capital construction items such as office, service, transport and work equipment. The information for these forecasts is obtained from the appropriate parts of the organization.

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4.1.5.3 Long Range Forecasting

Capital expenditures for various power system expansion proposals are projected by a combination of manual and digital computer techniques. These techniques are an extension of the CAPFOR Forecasting System and integrate its output into the long range forecast. The forecast capital expenditures for the committed or approved generation projects are input into the Capital Expenditures (CAPEXP) Module of a computerized financial simulation program (the Financial Planning Model).

The CAPEXP Module computes the expected capital expenditures for the particular generation expansion proposal being simulated. These expenditures are then added to those from the CAPFOR System. The cost of incorporation facilities (e.g. transformation and transmission facilities) is based on information available from the CAPFOR System which is extended by extrapolation. These costs are subsequently added to the generation project expenditures. The basic data required for the long range projections is obtained from the Engineering Branch.

The long range capital expenditure projections consist of three categories:

- current committed projects;
- proposed projects in the System Expansion; Program; and
- other future projects.

Although the numbers generated by a particular forecasting or simulation process may give the appearance of precision, it can only be a best estimate. Forecasting errors will increase as the time period is lengthened. Some of the causes of forecasting error in the long range capital expenditure projections are:

(a) errors in estimating the present day construction costs of new prototype stations.

(b) errors in estimating future escalation and interest rates.

(c) errors in estimating the time periods required for construction.

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4.1.6 Capital Availability (8),(9)

Historically, Ontario Hydro was able to finance most of its capital construction program by the issue of long term bonds in the Canadian bond market. This source of funds was supplemented by occasional issues in the U.S. long term bond market when the Canadian market appeared to be less receptive to a new issue and/or the spread between the U.S. and Canadian bond yields was especially favourable. From an operational point of view, an alternative source of funds such as that provided by the U.S. bond market means greater flexibility in the timing, pricing, and size of new bond issues, which are important practical considerations.

Ontario Hydro's preference, whenever possible, for Canadian long term bond financing is understandable in view of the long term assets created with these funds. This preference remains unchanged. What has changed, however, is that Ontario Hydro's increasing needs for capital, combined with the increasing needs of other borrowers, has outstripped the available supply of long term funds from Canadian sources.

Ontario Hydro has, therefore, been required to resort to other, less preferred sources of capital in recent years and this trend is expected to continue. This will mean greater reliance on U.S. and other foreign sources of capital, as illustrated below:

	1971-75	1976-82
Canada	63%	43%
U.S.	31%	40%
Other Foreign	6%	17%
	100%	100%

Ontario Hydro has also increased its reliance on short and intermediate term bonds as opposed to traditional long term bonds. This trend is also expected to continue as illustrated below:

Term	1974-75	1976-82
5 years or less	6%	15%
6 - 15 years	14%	25%
over 15 years	80%	60%
	100%	100%

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It is important to recognize that estimates of capital availability are based on an assumption of normal market conditions. However, changes in market conditions can occur rapidly as a result of unpredictable developments on the domestic and international front. Examples of developments which could reduce the amount of available capital are as follows:

1. Monetary and fiscal policy changes in Canada or abroad could reduce funds available.

2. A strong Canadian dollar could lead to moral suasion from the Bank of Canada to limit foreign borrowing. Similar considerations in foreign countries could reduce capital outflows.

3. The petrodollar market is relatively new and untested. It appears that earlier estimates of surplus oil revenues were too optimistic. Petrodollar investors have also exhibited a strong preference for short term and highly liquid securities.

4. Possible arbitrary restrictions on international movements of capital through changes in withholding taxes and interest equalization taxes.

5. Increased competition for funds due to large capital expenditures on energy related projects.

6. Increased borrowing by governments to finance deficits may also increase competition for funds.

7. There may be a downward shift in the demand for long term bonds if inflation increases instead of subsiding.

8. European and Japanese markets are very volatile and cannot be regarded as a reliable source of substantial funds on a continuing basis.

For these reasons, estimates of capital availability have to be used with considerable caution. Ontario Hydro's approach to this problem is for the Treasury Division to request capital availability estimates from its Syndicate Managers, McLeod, Young and Weir Co. Ltd. and Salomon Brothers. These estimates are then modified as a result of analysis in Treasury Division and discussions with Ontario Hydro's Chief

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Economist and the Province's Ministry of Treasury, Economics and Intergovernmental Affairs.

The latest estimates, completed in March 1976, are given below. Treasury Division's final estimates shown under the heading "Strategically Reliable Estimates" are compared with the Syndicate Managers' estimates:

Capital Availability

	Syndicate Managers' Estimates	Strategically Reliable Estimates
	($ Million)	
1976	2,150	1,750*
1977	2,150	1,620*
1978	2,400	1,780*
1979	2,600	2,010
1980	2,850	2,220
1981	3,025	2,440
1982	3,275	2,670
	18,450	14,490

* The estimates for 1976-78 are shown for comparison purposes only, because borrowing limits for 1976, 1977 and 1978 were set at $1.5 billion per year by the Provincial Treasurer in a letter to Mr. R.B. Taylor, Chairman of Ontario Hydro dated January 22, 1976.

The Syndicate Managers' estimates are derived from recent experience in the various markets and the historic growth rates in total volume of new bond issues, modified by their judgment of the impact of discernable trends. Recent developments specified by the Syndicate Managers which have caused them to adopt a more cautious approach are:

1. Increased attention by investors to the credit worthiness of junior governments following on the near bankruptcy of New York City.

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2. Inflationary pressure is still high in Canada which will maintain investor preference for short-term instruments.

3. Borrowing by Canadian provinces in domestic and foreign markets increased significantly in 1975. A high level of borrowing is expected to continue in 1976.

4. Monetary expansion in Canada is still high and the Bank of Canada is expected to continue to restrain monetary growth.

5. Canadian withholding tax on interest payments on new issues of corporate bonds was abolished in the federal budget of June 23, 1975, thereby increasing competition for provincial borrowers who have always been tax-exempt.

6. Housing starts have increased sharply in Canada and increased investment in mortgages could reduce funds available for new bond issues.

The Syndicate Managers also specify the assumptions underlying their forecasts, the most important being that the Province and Ontario Hydro maintain their combined prime credit rating.

The impact of these factors on capital availability is real even though the effect is impossible to quantify. It is, therefore, worth reiterating that these estimates should be used with caution and are subject to frequent reassessment. Estimates for later years in particular should be regarded as indications rather than predictions of capital availability.

4.1.7 FINANCIAL POLICIES

Ontario Hydro's financial policies are governed by internal financial objectives which include the following:

(a) to finance needed facilities at the lowest feasible cost consistent with a financially sound operation.

(b) to allocate the cost of capital facilities equitably among present and future customers.

(c) to be financially independent, remaining at arm's length from government in financial matters, excepting the Provincial guarantee of Hydro's debt.

(d) to maintain a level of liquidity sufficient to achieve the above objectives.

The financial policies need to be continually re-examined and re-shaped because of changing conditions, but always within the constraints of generally accepted accounting principles.

Certain financial objectives can conflict with one another. The equitable division of costs between present and future customers is difficult and can conflict with the objective of maintaining financial integrity. Thus judgement is required in setting financial policies.

The major financial policy areas relate to:

(a) Classification of expenditures to current operations and capital, including policies on overheads and interest.

(b) Depreciation.

(c) Appropriation for Debt Retirement and System Expansion.

(d) Treatment of accumulated equity.

(e) Basis for setting aggregate annual revenue requirements.

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4.1.7.1 Policies on the Classification of Expenditures to Current Operations and Capital

Ontario Hydro's policies relating to the classification of expenditures between current operations and capital, are as follows:

(a) Expenditures directly related to the operation and maintenance of physical assets are classified as current operations.

(b) Expenditures directly related to the purchase or construction of physical assets are classified as capital.

(c) Expenditures for internal service functions are allocated, when practical, to the work unit using the service and subsequently to current operations or capital, depending on the work performed by the work unit. When this allocation is not practical, such expenditures are treated as overhead.

(d) Appropriate interest and overhead costs are charged to the capital cost of the physical asset prior to the in-service date of the asset. After the in-service date, these costs are charged to current operations.

To ensure that present customers are charged with the cost of power they use, costs are related, where material and readily identifiable, to the facilities which serve them. In addition, to achieve an equitable distribution of costs between present and future customers, costs are related, again where material and readily identifiable, to the construction or purchase of capital assets.

The debt of Ontario Hydro is related to two types of capital assets, those which are in service and contribute to operation of the system in the current fiscal year, and those which are under construction and will contribute to future operations. As discussed below the interest cost associated with funds used for assets under construction is capitalized and deferred to future periods. Essentially, all other interest is charged to current operations.

A. Policy on the Internal Allocation of Overhead

Overhead in Ontario Hydro comprises the cost of administrative activities and supporting services which form part of the cost of doing business, but which are not readily identifiable with the operation, maintenance or construction of specific physical assets. The overhead

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policy is to charge to current operations the cost of those overhead activities which contribute to the on-going aspects of the business. Any additional overhead costs incurred as a result of the construction of physical assets are a cost of future operations and are charged to capital.

B. Policy on Interest Costs

It is Ontario Hydro's general policy to capitalize the interest costs related to funds used for assets under construction and to charge other interest costs to current operations. In this way, present customers are not required to pay the interest cost related to construction in progress for the benefit of future customers.

Capital expenditures are financed partly by internally generated funds and partly by external borrowings. Ontario Hydro places the same value on funds generated internally as on those borrowed externally, therefore, in calculating the amount of interest to be capitalized each year, the capitalization rate is applied to the full amount of expenditures in plant under construction.

The rate at which interest is capitalized is the weighted average interest cost of bonds issued in each of the years in which expenditures on existing plant under construction were incurred; the weighting of the average interest cost reflects the expenditures carried in plant under construction for each of the respective years. The average bond interest cost includes any discounts or premiums, expenses incurred in floating the issue and the compounding effect of semiannual interest payments.

The capitalization rate is calculated twice a year and is revised if a change of 1/4 of 1 per cent or more is indicated.

4.1.7.2 Policy on Depreciation

Ontario Hydro's depreciation policy is to distribute the original cost of capital facilities over their estimated useful lives in a systematic manner. The purpose is recovery of cost. Depreciation charges add to the pool of funds available for replacement of assets and for financing system expansion.

Major Capital Facilities

Two basic methods of applying this policy are currently used in Ontario Hydro when depreciating the major capital

facilities which comprise 98 per cent of Ontario Hydro's fixed assets.

(a) The sinking fund method is applied only to assets in service on December 31, 1970 exclusive of thermal generation stations. This method is one whereby annual depreciation charges on a specific asset increase over the life of the asset.

(b) The straight line method is applied to all major facilities placed into service on or after January 1, 1971 and to all thermal generating stations already in service on December 31, 1970, consisting primarily of Lambton, Lakeview, Hearn, Keith and Thunder Bay Generating Sations.

Ontario Hydro's depreciation policies relating to major fixed assets have recently been reviewed. As a result of this review the Ontario Hydro Board on February 9, 1976 approved various changes to the depreciation policies. These are to be effective January 1, 1977.

In accordance with the new policies:

(a) all major fixed assets will be depreciated on the straight line remaining life method.

(b) where salvage recoveries, removal costs or decommissioning costs are identifiable and estimable with some degree of confidence they are to be recognized when establishing the depreciation rate.

(c) asset lives are to be reviewed annually.

Minor Capital Facilities

Minor capital facilities, which comprise the remaining 2 per cent of Ontario Hydro's fixed assets, include various types of equipment. While some of these are also depreciated by the straight line method, other methods, such as the declining balance, are also used. The latter method charges more depreciation in the early periods.

4.1.7.3 Land Depreciation

Since January 1, 1975, it has been Ontario Hydro's general practice to treat the purchase price and acquisition cost of land as a non-depreciable asset. Minor exceptions exist in instances where it is considered that land does not retain its original value or does not have an unlimited useful life.

Line Number

4.1.7.4 Appropriation for Debt Retirement and System Expansion

Equity capital has been acquired by Ontario Hydro from its customers in two ways. Firstly, as required by the Power Corporation Act, Ontario Hydro charges to operations an annual amount which, together with interest at 4 per cent per annum, would retire debt over a forty-year period. Secondly, equity has accumulated through the net result of provisions to and withdrawals from the Reserve for Stabilization of Rates and Contingencies.

In recent years, the expenditures on the construction program increased to the extent that there was growing concern over the ability of Ontario Hydro to obtain the necessary funds through normal sources and at reasonable market rates. In view of this, Ontario Hydro on December 12, 1973, approved a new capital charge called "Appropriation for Debt Retirement and System Expansion". This charge was to replace the former charges for debt retirement and provisions to or withdrawals from the Reserve for Stabilization of Rates and Contingencies.

An amendment to the Power Corporation Act is required to establish the "Appropriation for Debt Retirement and System Expansion". As the amendment has not yet been passed the equity charges included in the cost of power continue to be identified in published statements as "net income" which is appropriated for "Debt Retirement" and "Stabilization of Rates and Contingencies".

The amount of net income required is established annually on the basis of the following criteria:

(a) the maintenance of Ontario Hydro's financial soundness

(b) the availability of debt capital

(c) the impact on electricity rates

(d) adequacy of the system expansion program

The minimum appropriation is the annual sum, together with interest at 4 per cent per annum, which is sufficient to retire debt in forty years. This amount must be used for debt retirement and any amount over this minimum may be used either for debt retirement or system expansion. This minimum Debt Retirement Charge is a requirement of the Power Corporation Act.

Line Number

As an outcome of the 1974 rate hearings before the Ontario Energy Board, Ontario Hydro undertook a study to determine appropriate criteria for setting a level of equity financing for Ontario Hydro (10). The first objective of this study was to establish criteria by which financial soundness can be judged on a continuing basis and be compared to similar utilities. It was concluded that differences among corporations including risk, capital structure, and financing needs make it virtually impossible to establish rigid criteria for the purpose of assessing financial soundness.

The second objective of the study was to determine if an optimum debt/equity ratio or other similar measure could be set in keeping with the criteria established. The report concluded that an optimum debt/equity ratio, or any other measure could not be established with precision. A third objective of the report was to prepare a position on the appropriateness of using rate of return as an indicator of financial and economic performance. It was concluded that rate of return measures have a sound basis in economic theory as a technique for assessing financial performance and assisting in the setting of prices to encourage effective use of resources. However, differing capital structures, risk and sources of capital create significant problems in developing useful and acceptable rate of return measures.

4.1.7.5 Allocation of Equity

Customers' equity in Ontario Hydro has accumulated to the extent to which customers retired debt or contributed to the Reserve for Stabilization of Rates and Contingencies through rates. The debt retirement portion of equity is credited to specific municipal utilities and the Power District which consists of direct industrial and retail customers of Ontario Hydro. The Reserve for Stabilization of Rates and Contingencies is a general reserve held for the benefit of all customers and, therefore, equity acquired through the net result of provisions to or withdrawals from this reserve is not allocated to individual utilities or the Power District.

If through annexations, amalgamations or the formation of new municipal utilities, groups of customers transfer from one supply authority to another, appropriate equity is transferred.

Line Number

4.1.7.6 Basis for Setting Aggregate Revenue Requirements

Because annual cost changes can be rather erratic, efforts have been made to establish annual rates on the basis of averaging revenue requirements for each of the ensuing several years.

Specific formulae were developed to formalize the procedure for setting aggregate revenue requirements and these were accepted in principle by the Ontario Energy Board in 1974. They, however, recommended against their implementation in setting 1975 rates. While the procedure was used to establish Hydro's rates proposed for 1976, subsequent cutbacks in the rate increase nullified its application.

Line Number

References

1. Ontario Department of Treasury and Economics . Sectoral Characteristics of the Ontario Structure of Production, Ontario Economic Review, Special Supplement, March 1972.

2. Ontario Ministry of Treasury, Economics and Intergovernmental Affairs . Consumption of Fuel and Electrici by Ontario Manufacturing Industries 1972, Ontario Statistical Centre, May 1975.

3. Ontario Hydro . Manual on Cost Minimization as Applied to Alternative Expenditur Decisions, December 1975.

4. Ontario Hydro . Examples of the Applications of Managerial Economics Techniques.

5. Ontario Hydro . The Process Description on the Economic Forecasting Series, whic was Exhibit 32 in the Submission to the Ontario Energy Board on Bulk Power Rates for 1976.

6. Ontario Hydro . Economic Forecasting Series, approved March 8, 1976.

7. Ontario Hydro . The Process Description on the Capital Expenditures Forecast, which was Exhibit 33 in the Submission to the Ontario Energy Board on Bulk Power Rates for 1976.

8. McLeod, Young, Weir and Company Ltd. . Estimated Capital Availability for the Province of Ontario and Ontario Hydro 1976-1982", February 1976.

9. Salomon Brothers . "The Availability of Capital in the United States 1975-1982", March 1975 - A report containing updated information is shortly to be available.

Line Number

10. Ontario Hydro

- "A Study to Determine Appropriate Criteria for Setting a Level of Equity Financing for Ontario Hydro", January 1975.

Line Number

4.2.1 INTRODUCTION

This section, 4.2, deals with the question of community impact in terms of the impact of generating stations on communities neighbouring on the station sites. It is recognized that other Hydro facilities may also cause community impacts. It is intended that future studies be undertaken to determine whether and to what extent communities are affected by other facilities such as transmission lines. At the same time, it should be pointed out that those in Ontario Hydro responsible for transmission planning do consider community factors in the route selection process.

4.2.2 BACKGROUND

4.2.2.1 What is Community Impact?

Community impact may be defined as any change imposed on a community's social or economic situation as it presently exists, as it would otherwise develop, or as it was previously planned.

4.2.2.2 How does Ontario Hydro Cause Community Impact?

Construction and operation of large Hydro facilities affect the social and economic structure of neighbouring communities in a variety of ways. The influx of relocated workers, some with families, results in an increased demand on housing, consumer goods, and all types of services. The latter include health, recreation, libraries, education, police and fire protection, and municipal administration. Other potential social and economic effects may be caused by increased demands on local labour supply, payment of grants-in-lieu of taxes (See Appendix 4.2-1), Hydro labour relations (see Appendix 4.2-2), local purchases of materials and services by the project, and traffic generated by project employees and material deliveries.

The above effects may be beneficial or detrimental or both; for example, construction of a facility may produce more local job opportunities but, at the same time, reduce the available labour supply for some local industry.

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The degree to which the communities will be affected depends on the number of relocated workers and their accommodation and lifestyle requirements, the present size and economic base of the communities, the ability of the communities to meet increased demands on services, and the condition and capacity of local transportation routes and facilities.

4.2.2.3 Why does Ontario Hydro Examine Community Impact?

Hydro has developed a policy that communities should not be required to shoulder the burden of costly impacts induced by the construction and operation of its facilities.

A procedure has been developed to determine the degree of impact on neighbouring communities. It commences at the initial site selection stage and continues through the construction and commissioning stage to full operation of the facility.

4.2.2.4 Evolution of Community Impact Studies

In the past, a number of actions have been taken to relieve a municipality of costly impacts due to large Hydro projects. These actions were carried out in an era when the impact of a project on a community was generally considered to be outweighed by its economic stimulus.

In 1971, studies on the community effects due to Lennox Generating Station (1) and the proposed Wesleyville and Darlington Generating Stations (2) (3) were undertaken. In 1973, a community area inventory study was completed for a potential new site in the Eastern Region (4).

A study to forecast the community effects due to Thunder Bay Generating Station Extension (6) was completed in June, 1975. A current inventory of community facilites was undertaken for the proposed Darlington Generating Station (8), also in 1975.

The Bruce Nuclear Power Development is one of the largest power developments in a rural setting in Ontario and has attracted to the area a sizeable number of workers. Hydro realized that these workers placed a burden on the nearby communities. This

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recognition has resulted in the largest payments to date to affected municipalities.

In 1970, Ontario Hydro commenced payment of a $1,000,000 supplementary allowance in addition to the grant-in-lieu of taxes for Bruce Nuclear Power Development. It was to be paid to the County of Bruce in ten equal annual installments of $100,000 and shared by the County, the Bruce County Board of Education, and the local municipalities affected by the influx of new residents to be employed at the Development. The purpose of this grant was to relieve the burden on residents for the required extra educational and community facilities.

As a result of continuing review, the consulting firm of M.M. Dillon Limited was hired in 1973 to undertake an independent study of the Development's community impact. This study, completed in October 1974, was followed by meetings with the affected municipalities that resulted in an agreement to substantially increase the amount of the supplementary allowance, and to compensate the municipalities for costs still outstanding to the year 1975. Advance allowance payments of $250,000 each were paid to Kincardine and Port Elgin during the course of the study.

In addition to the above supplementary allowances, Hydro has and will continue to compensate the local municipalities for damage done to roads due to increased traffic from material deliveries and project employment. Total payments to date for road damage due to Bruce Nuclear Power Development have totalled approximately $65,000. An equal amount has also been set aside for remedial work already agreed upon but not yet undertaken.

Hydro has recently concluded an agreement with the Ministry of Transportation and Communications to construct a new traffic corridor to the Development at a cost of more than $2 million. Scheduled for completion in 1977, it is designed to significantly reduce the project's traffic load on existing municipal roadways.

4.2.2.5 Involvement of Community

Community involvement is now sought from the commencement of a community impact study to its

completion. This involvement includes identification of issues, reviewing the study terms of reference to ensure that all issues will be adequately considered, supply of data on existing and planned community facilities and, during the latter stages, a review of the study findings for final comment before a report is completed.

In the case of a recently commissioned Wesleyville Generating Station - proposed Darlington Generating Station study by the consulting firm of James F. MacLaren Limited, the two project host municipalities (Hope Township and the Town of Newcastle) were given the opportunity to review the proposed list of consultants being considered for the contract, prior to final selection.

4.2.3 SCOPE OF COMMUNITY IMPACT STUDIES

4.2.3.1 Extent of Study Area

The study area normally comprises municipalities that are in the immediate area of the facility, but also includes those that are more distant if significant community impacts have or are anticipated to occur there.

4.2.3.2 Socio-economic Factors Considered

The community impact studies analyze the following factors for each municipality included in the study area, and determine the impact on them due to construction and operation of the facility:

(i) employment - includes labour availability, wage rates, etc.

(ii) population - regional and local

(iii) housing

(iv) economy - regional and local

(v) financial condition - municipal

(vi) historical and archeological significance

(vii) land-use plans and objectives - regional and local

(viii) services including:

- sewage collection and treatment
- water treatment and supply
- solid waste collection and disposal
- health
- recreation
- libraries
- education
- roads
- police and fire protection
- municipal administration, including administrative costs, municipal planning and zoning

4.2.4 METHODOLOGY OF COMMUNITY IMPACT STUDIES

Figure 4.2.4-1 illustrates the program of community impact studies and measures as it commences during project site selection, through design and development, construction, and to operation and maintenance of the facility. The following sections describe the program activities.

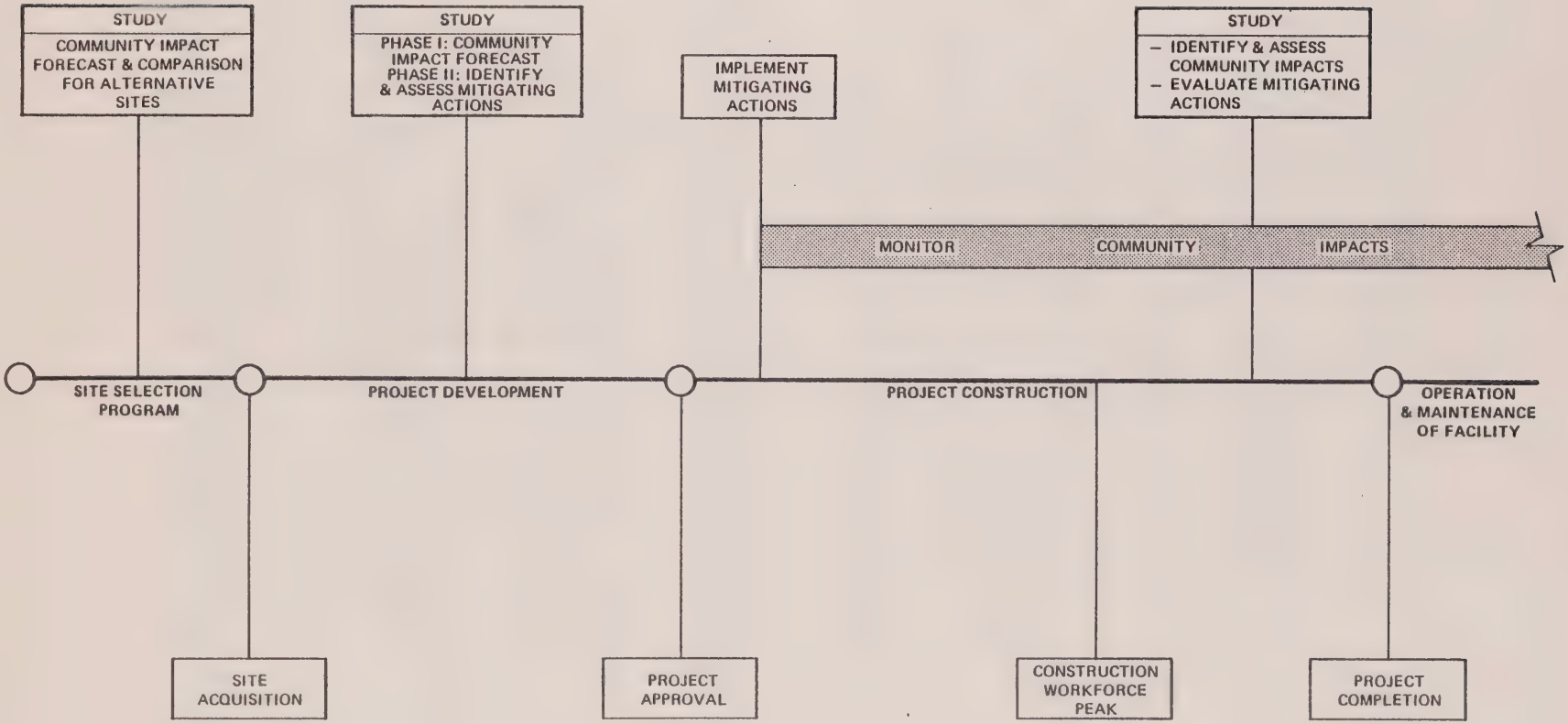
4.2.4.1 During Site Selection

The community impact analysis during site selection is a prediction and comparison of the degree of impact that would result from development of each alternative site.

The socio-economic factors listed in 4.2.3.2 are related to each generating station siting alternative. The study is carried out to the depth necessary to identify significant problems and benefits and to evaluate differences in community impact of the alternative sites.

Taking the factor education as an example, the quality and capacity of existing and planned educational facilities in the study area are analyzed. The results of this analysis and analysis of other factors are then used to predict the probable settlement pattern of project workers for the alternative sites. The impacts of this settlement pattern are costed where possible and identified in qualitative terms where more appropriate.

FIGURE 4.2.4-1
PROGRAM OF COMMUNITY IMPACT STUDIES



The study is carried out as follows:

(i) Base Data Preparation

- sources include study area communities, provincial ministries and agencies, Ontario Hydro, and other relevant documented data.

(ii) Analysis of Current Socio-Economic Situation in Study Area

(iii) Projection of the Development of Communities in Study Area without the Facility

(iv) Projection of the Facility's Induced Needs

(v) Assessment and Comparison of the Community Impact for Alternative Sites

- the significant benefits and problems are identified and the possible mitigating actions for the latter and their costs are examined.

An example of the above study is one that is presently in progress: a community impact comparison of three alternative site locations for an energy centre in the North Channel area between Sudbury and Sault Ste. Marie.

The conclusions on community impact for alternative sites are added to the other site selection criteria that include effects on the natural environment, accessibility, capability to provide for cooling requirements, and foundation conditions.

The evaluation of all factors is carried out in the form of a Site Environmental Assessment that becomes part of the proposal for provincial government approval to acquire the site. The assessment is prepared to meet the requirements of the Environmental Assessment Act.

4.2.4.2 <u>During Project Development</u>

At this stage, the project specifications are known and more accurate forecasts can be made of labour and servicing requirements (e.g. the project is for 4 x

750 MW nuclear units with an in service date of 1990). Experience from other projects enables a reliable forecast of labour by type, quantity and timing.

A study is then done in two phases. The first is a prediction of the degree of community impact due to the proposed project. It is carried out under a similar format as the study done during site selection. The second phase includes an elaboration of the significant problems identified earlier, and identification and analysis of alternative mitigating actions.

Examples of the first phase of this study include one that has just been completed by Proctor and Redfern Limited for a proposed thermal generating station near Atikokan, Ontario (9), and the one recently commenced by James F. MacLaren Limited for Wesleyville Generating Station and the proposed Darlington Generating Station. An example of the second phase is one that has recently commenced by Proctor and Redfern Limited for the proposed project near Atikokan.

The results of the community impact study for the proposed project are incorporated into the project environmental assessment.

4.2.4.3 Following Project Approval

Following approval to construct the facility, it is intended that appropriate mitigating actions be implemented from the alternatives previously identified. The detailed design and implementation of these actions require close cooperation between the community, all levels of government and Ontario Hydro. Assistance from Hydro in the implementation of these actions will be subject to the degree of its responsibility determined in the earlier study, and the availability of provincial and federal assistance programs.

4.2.4.4 During Construction

During construction of the facility, it is intended that the community impact be monitored and interim measures be taken to correct unforeseen difficulties imposed by the project.

Following the peak impact period, which usually occurs when the peak construction work force is on the project site, a study that includes the following is undertaken:

(i) Estimate and evaluate community impacts that have occurred

- the community impact attributable to Hydro, in terms of both costs and benefits to the community, is determined by comparing present socio-economic conditions to a projection of what they would have been had Hydro not embarked on construction of the facility.

(ii) Assess effectiveness of actions already taken to correct problem areas.

(iii) Review and update previous forecast of community impact due to completion and operation of facility.

Examples of this phase include one completed in 1974 by M.M. Dillon Limited for Bruce Nuclear Power Development (5) and one presently in progress by Marshall Macklin Monaghan Limited for Lennox Generating Station. This phase may then be followed by implementation of additional mitigating actions, if required.

4.2.4.5 After Construction is Completed

No formal studies have yet been undertaken following completion of construction, although such studies are intended for the near future.

4.2.5 FUTURE DEVELOPMENT IN COMMUNITY IMPACT FIELD

The following are possible areas for future development in this field:

- examination of transmission line community impacts

- social changes as a result of Hydro facilities

Line Number

- participation with other government agencies in regional planning by analyzing the community impact of Hydro facilities.

Line Number

List of References

Reference No.	Author	
1	Ontario Hydro	Lennox Genertating Station Community Impact Study March 1971
2	Ontario Hydro	Wesleyville Site Community Impact Study July 1971
3	Ontario Hydro	Bowmanville Site (for Darlington Generating Station) Community Impact Study August 1971
4	Ontario Hydro	Proposed Eastern Region Thermal Site (Chubb Point & McGlennan Point Sites) May 1973
5	M.M. Dillon Limited	Bruce Nuclear Power Development Community Impact Study Summary Report September 1974
6	Ontario Hydro	Thunder Bay Generating Station Extension Community Impact Study - Parts I & II June 1975
7	Ontario Hydro	Wesleyville Generating Station Community Impact Study - Parts I & II October 1975
8	Ontario Hydro	Proposed Darlington Generating Station Community Impact Study - Part I October 1975
9	Proctor & Redfern Limited	Marmion Lake Site Proposed Thermal Generating Station Community Impact Study Phase I January 1976

Line Number

February 11, 1976

APPENDIX 4.2-1

GRANTS-IN-LIEU OF TAXES

Under the provisions of the Power Corporation Act, March 1974, Ontario Hydro and its property are not subject to taxation for municipal or school purposes, except for local improvements. The Act does provide, however, that grants-in-lieu of taxes be paid to local jurisdictions in which Hydro lands and buildings are located. It is intended to approximate the property taxes due on a similar commercial property.

The tax base or assessment for grants-in-lieu payable by the Corporation is as follows:

(1) Land is assessed at the average value of land in the vicinity.

(2) Buildings - executive or administrative office types are assessed in the normal manner as other similar type buildings. Generating, transformer or any other station type are assessed at the present rate of $8 per sq ft of inside ground floor area, times the equalization factor given by the Assessment Branch of the Ministry of Treasury, Economics and Intergovernmental Affairs.

(3) Business assessment - 60% of realty assessment (land and buildings).

The equalized assessment[1] multiplied by the commercial mill rate yields the amount of the grant-in-lieu payment. The grant-in-lieu in any year is not to be in excess of 50% of the total own-account revenues, excepting local improvement rates, required for the purpose of the municipality and all its local boards. It is paid in whole to the municipality and credited to its general funds.

The municipality retains the education portion of the grant-in-lieu other than as specified in Section 47, subsection 9 of the Power Corporation Act[2]. According to the act, they are only required to pay out the county portion of the grant-in-lieu. The grant-in-lieu is included in the general revenues of the municipality.

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At the time of acquiring property, Ontario Hydro pays the present tax on that property until the end of the particular current year. As of January 1 the following year, Ontario Hydro pays a grant-in-lieu to the municipality instead of tax on the property.

Special considerations are required with respect to grant-in-lieu payment in the cases of:

(1) Unorganized Territories

Properties owned by Ontario Hydro in unorganized territories are subject to the following levies:

(i) school board payments to the board having jurisdiction in the territory;

(ii) a payment to the local roads board, should any road services exist in the area;

(iii) a provincial land tax, payable only on those lands with residents thereon.

(2) Crown Land

Assessment is calculated in the usual manner and payments are made to the appropriate municipal and county authorities.

(3) Improvement District

For the purpose of grant-in-lieu payments, an improvement district is treated in the same manner as an organized municipality.

(4) Reclaimed Land

When Hydro reclaims land, this land is subject to all grant-in-lieu charges associated with purchased property. In the case of reclaimed land lying on the boundary of two jurisdictions, it would be necessary for the Councils of the two jurisdictions to establish the appropriate boundary. In some circumstances, boundary delineations into reclaimable areas (i.e. lakes) are already established.

Line Number

(5) Property (and Buildings) in Two or More Jurisdictions

In the case of buildings and/or property lying in two municipalities (or districts, etc.) an official survey is conducted to determine the relative portions in each jurisdiction. The normal levies are then applied to each section.

Table I indicates actual taxes and grants-in-lieu of taxes paid by Ontario Hydro in 1974.

Line Number

TABLE I

TAXES AND GRANTS IN LIEU OF TAXES PAID IN 1974

REGIONS

EAST SYSTEM	
Eastern Region	$ 752,689.77
Western Region	477,704.90
Georgian Bay Region	259,423.86
Niagara Region	1,563,007.91
Northeastern Region	369,525.23
Central Region	7,139,297.73
Miscellaneous	147,838.70
	$10,709,488.10
WEST SYSTEM	
Northwestern Region	$ 167,194.61
	$ 167,194.61

TOTAL

EAST SYSTEM	$10,709,488.10
WEST SYSTEM	167,194.61
	$10,876,682.71

Line Number

VALUATIONS

	LAND & BUILDINGS	BUSINESS	TOTAL
EAST SYSTEM	$98,465,247.	$52,968,160.	$150,792,382.
WEST SYSTEM	$ 1,271,170.	$ 514,020.	$ 1,785,190.
	$98,799,965.	$53,482,180.	$152,577,572.

586 Taxing Bodies

April 1975

Line Number

FOOTNOTES

(1) Equalized assessment is the assessment, as calculated, adjusted by an equalization factor. An assessment is the value placed on a taxable property for taxation purposes. The equalization factor is a ratio of average assessment to average sales value and varies between municipalities. Ontario Hydro receives this percentage figure from the Ministry of Treasury, Economics and Intergovernmental Affairs.

(2) This refers to the portion of the payments received under subsection 2 in respect of dwelling houses, including farm properties, rented by the Corporation to other persons that is attributable to levies for school purposes. It is paid by the municipal corporation to the school boards that would have been entitled thereto if the land had been assessed and taxed in the usual way.

Line Number

APPENDIX 4.2-2

LABOUR RELATIONS

In order to establish conditions applicable to employees engaged in Ontario Hydro's construction program, the Corporation bargains collectively with 11 craft unions either directly or through an association. In addition, agreements are also negotiated with the International Association of Machinists, the Hotel and Restaurant Employees' Union, and the Office & Professional Employees' International Union covering small specialized bargaining units within the construction sector.

Ontario Hydro's relationship with the craft unions began in 1949 when organizing activities in the heavy construction field started to take place and various certifications were granted to different unions at different work locations throughout the Province. In order to achieve some level of continuity across the Province, voluntary recognition of the international unions was granted by Ontario Hydro, initially at the Sir Adam Beck site. Today, with the exception of two trades--the International Brotherhood of Electrical Workers (IBEW) and the Cement Masons--the bargaining rights for Ontario Hydro are held by the international office of the respective unions. This level of union contact was considered the most appropriate because of the provincial nature of our construction program and because the international is the only level within the union that can act on a province-wide basis.

In the early 1950's, Ontario Hydro's wage philosophy was to apply Toronto rates, or a percentage of them, across the Province. This philosophy resulted in complaints from local contractors' associations that our rates were adversely affecting local negotiations. Shortly thereafter, local unions began to press for locally-established rates and working conditions because, in some cases, they had been able to exceed the Toronto rate. In the early 1960's, Ontario Hydro agreed to tie to "local rates" (including pension, welfare and subsistance allowance) and some local conditions.

While this policy established a temporary lull in local union demands, it was obvious in the early 1970's that the pressure to pick up all local rates and conditions was going to continue. The unions' claims were made even stronger by the fact that more work was being subcontracted and, in many cases, the contractor on the site was either signatory to or picked up

Line Number

local trade agreements in total, leading to a "hodgepodge" of labour conditions on any one of our sites.

An approach was made to both the international unions and to major contractors working on Hydro sites with the suggestions that all construction work on the site should be covered by one collective agreement, thereby eliminating the friction point between employers and establishing appropriate conditions for the electrical power systems sector of the industry. Based on past experience with council-type agreements, both the unions and the contractors agreed that the effort to establish such an agreement would be worthwhile. From these discussions The Electrical Power Systems Construction Association (EPSCA) was formed to negotiate a collective agreement with The Ontario Allied Construction Trades Council. The Council currently comprises:

Boilermakers
Carpenters
Insulators
Labourers
Millwrights
Operating Engineers
Painters
Teamsters

Although the involvement of all construction unions has not been achieved, efforts are continuing to find solutions to problems raised by those trades not involved in the Council in order to make it possible for them to become part of the Council and party to the EPSCA Agreement.

In negotiating collective agreements either through the Association or directly with a union, Hydro has become well aware of the possible disruptive impact a major project can have on an area. Because of this special contract conditions and practices have been adopted which are different from local agreements.

Employment

Our collective agreements provide for modification to the normal practice of the union hiring hall in that, once bona fide local union members have been placed to work, employers retain the right to hire local non-union members before bringing in non-residents. In addition, both unions and government agencies are notified of manpower requirements including the skill and experience necessary to meet the construction schedules. Also, upgrading programs particularly

Line Number

in the area of welder training and lineman training have been undertaken when attempting to meet the need for skills not readily available in the area.

Contracting Out

Although much of the major site installation is done by very large national and international contractors, much of the specialty work on the site can be contracted out to truly local contractors who benefit from the additional work available to them.

Wage Rates and Benefits

In order to not have a negative impact on local labour negotiations, Ontario Hydro has established a policy of picking up locally negotiated rates and benefits on the same date as they are recognized and paid by local contractors. By maintaining the same rate as the local contractors, Hydro is attempting to minimize any undue influence on local negotiations. At the same time, Hydro can ensure that the wage and benefit package paid to tradesmen working on a Hydro site are of equal value to those negotiated by the local union on behalf of those tradesmen.

Major Construction Projects' Effect on Local Manpower Supply

The bulk of the work force on any Ontario Hydro project is composed of skilled career tradesmen who are members of the various craft unions. In the semi and unskilled categories such as labourers and teamsters, possibilities exist for more employment of local people.

In fact, pressure emanates from all levels of government, Canada Manpower offices, Unemployment Insurance Commission offices, educational and penal institutions to employ as many local people as possible. On the other hand, unions in the construction industry negotiate agreements which contain hiring hall clauses requiring that employers employ only union members as referred from the hall until such time as the hiring hall is unable to supply.

On the basis of collective agreements affecting Ontario Hydro, a modified hiring hall provision has been implemented whereby local union members are employed first, and local non-union people may be hired after the supply of local union members is exhausted. This gives Ontario Hydro the opportunity to co-operate with the various governmental agencies in the area who

Line Number

are seeking employment for particular individuals, but at the same time, means that local non-union people tend to be employed last. This makes their tenure of employment shorter than others on the project and provides less attraction to them to leave secure employment in local industry for short-term, high-priced employment in heavy construction.

The impact of major project employment on local manpower is not limited to Ontario Hydro, but is true of any major construction or permanent installation required by either the private or public sector. Such things as steel mills, oil refineries, penal institutions, schools and colleges that are built in predominantly rural parts of Ontario introduce generally higher wage rates and greater employment opportunities than the local industrial concern or farm.

Zoning

Prior to World War II, Ontario Hydro retained a wage and salary governing system that paid differing wage rate levels for a single classification. This was determined by the geographic location of an employee's residence and work headquarters. This system recognized five or six levels encompassing in excess of a 10% differential.

In response to constant post-war employee and union pressure, both the number of levels and percentage differentials were reduced to three as follows:

A Zone - 100%
B Zone - 97%
C Zone - 94%

During the 1968 negotiations, the total elimination of Zoning was again an issue and one which was carried through to the conciliation stage. As a last issue of concession, Ontario Hydro was prompted by outside suggestion to concede this issue and eliminate the zoning system as of April 1, 1971.

4.3 Property Policies and Practices of Ontario Hydro for High Voltage Transmission Line Rights-of-Way and Station Sites

4.3.1 General Policy

More than 23,000 miles of transmission lines cross Ontario, carrying electricity from generating stations en route to consumers. Where these lines encroach on public or private properties, the necessary property rights are acquired by Ontario Hydro and the owners compensated.

In the past, Ontario Hydro specified the type of rights required for its transmission lines. Where possible, only easement rights were acquired but often outright purchase was necessary. In most cases, property settlements were obtained through negotiation. Expropriation was only resorted to when a settlement could not be reached before construction had to start in order that an adequate power supply could be provided to the area concerned.

On May 13, 1974, the Board of Directors of Ontario Hydro approved more flexible policies for the acquisition of transmission line rights-of-way. The policy was worked out in close cooperation with farm organizations and in consultation with several government Ministries and outside agencies.

In response to requests from the farm community, including the Ontario Federation of Agriculture, the National Farmers Union, and Christian Farmers Federation of Ontario, for full protection for farmers under The Expropriations Act(1), expropriation procedures are now applied to all owners. Although these procedures do not prevent negotiated settlements for compensation, they ensure that owners will have full protection of the Act, especially the Hearing of Inquiry, the Board of Negotiation, the Land Compensation Board and other rights guaranteed by the Act.

In most cases owners are given the choice of Ontario Hydro acquiring full ownership, or an easement in perpetuity(12) of the land required for transmission line rights-of-way.

Where an easement is acquired, the owner may choose to be paid either in a lump sum or by an annual adjustable payment described below.

Where full title of the land is acquired for transmission rights-of-way, the former owner may in most cases license[2] it back for agriculture at a nominal fee of $1 per acre per year, plus taxes. The licensing of Hydro owned lands has been responsible for maintaining approximately 16,200 acres of rights-of-way for food production.

As provided in The Expropriations Act, payment is based on the land's market value, together with compensation for damages and injurious affection where applicable, to which may be added allowances for such matters as reasonable expenses and disturbance. As well, Hydro recognizes the special impact which a transmission line has on farm operations and is prepared to make an additional allowance for this disturbance.

Compensation for an easement over agricultural land is based on 75 per cent of the market value of the land to cover the basic right-of-way. To this is added an additional payment for tower structures. Details of the basis of calculation of compensation are set out in 4.3.2.4(a).

There is no corresponding easement compensation formula for non-agricultural land. In such cases the loss of value is determined by an appraisal.

These are, in brief, the policies which have been adopted in the acquisition program for transmission line routes. Most of the same policies apply in cases of acquisition of station sites. This subject is dealt with more particularly in 4.3.4 below.

4.3.2 Acquisition Policies

4.3.2.1 Informing Affected Property Owners

When specific property requirements for new power facilities have been defined and government approval received, a meeting is arranged with affected owners to discuss the location of the right-of-way on their property. After this, the expropriation-negotiation process is started to acquire the needed property rights.

(a) Information Letters[6a,6b]

A letter is sent to each affected property owner advising that acquisition procedures are being started. Local members of the Provincial

Parliament and Mayors and Reeves are similarly advised.

(b) Public Meetings

The next step is to make owners fully aware of the property acquisition policies and procedures. For this purpose, a series of meetings are held in such places as local schools or community halls. The affected property owners are invited by letter(7). At these meetings, Hydro representatives explain the acquisition process in detail, including:

i) Expropriation procedures, their benefits and protections.

ii) The timing of events in the acquisition process.

iii) The options available to owners in granting the necessary property rights to Hydro.

iv) How compensation is determined.

v) How damages are corrected or compensated for.

vi) Forestry practices.

vii) Construction practices.

(c) Meetings with Individual Property Owners

Following the public meetings, a senior property agent and a right-of-way technician call on individual property owners. The technician discusses tower locations in an effort to minimize their impact on the property. Permission is requested to survey, appraise, do soil testing and, if necessary, do a woodlot evaluation. As required, further explanation and clarification of the acquisition policies is given. An "Information Package" containing the following material is left with the property owner:

i) A summary of the property policies and practices of Ontario Hydro for High Voltage Transmission Lines and Stations.

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ii) A copy of the property acquisition schedule[5] outlining predicted times of the various steps in the process.

iii) A copy of the pamphlet "Acquiring Land for High Voltage Transmission Lines"[3]. This pamphlet details acquisition policies and procedures.

iv) A copy of the booklet "Field Practices" setting out Ontario Hydro's standards of procedure and communication with land owners.

v) The location and telephone number of the property project field office where any inquiries or concerns can be directed.

4.3.2.2 Land Rights Required By Hydro

In acquiring property rights for transmission lines the owner has generally the choice of allowing Ontario Hydro either to acquire an easement or full ownership of the land involved. There may be a few situations, such as in the immediate vicinity of stations, where engineering constraints require that Hydro own the land. But these are rare.

(a) Easement[12]

An easement is a limited interest in the land and implies only a partial interference with the owner's rights to the land. In other words, in an easement Hydro buys certain rights and assumes certain responsibilities. The property owners sell certain rights and retain certain privileges.

When an easement is acquired, title to the property remains in the owner's name but becomes subject to the easement. The owner continues to be responsible for the property taxes. Although easements can take various forms, most are for the limited right of using a portion of the property for a power line route. The owner is not permitted to erect buildings on the easement. The easement includes the right to enter the property from time to time to inspect and do maintenance or repair and reconstruction work on the transmission line facilities. Where any damage occurs during the construction period or as a result of the required maintenance and

repair, a Hydro representative will investigate and arrange for payment in settlement of the damage or arrange necessary repairs. This would include consequential and unavoidable damages to crops, tile drains, culverts, rutting, fences, and access roads.

(b) Full Title (Purchase)

When Hydro acquires full title to the land, it assumes ownership including responsibility for taxes and other aspects of land ownership. In virtually all cases of transmission rights-of-way across agricultural lands, the former owner can obtain a licence(2) from Hydro to continue farming the land after the lines have been built. In accordance with the licence agreement, 12 months' notice is given prior to entry for construction and maintenance purposes. Where it is not possible to give the required notice, as in the case of an emergency, Hydro will compensate for the resulting loss or damage caused by the necessary work.

4.3.2.3 Property Appraisals

Compensation is based on the market value of the property, which is defined as the amount that the land might be expected to realize if sold on the open market by a willing seller to a willing buyer. The determination of market value, together with injurious affection where applicable, is made by a professional appraiser. The market value is usually determined from an examination of recent sales of similar properties in the same general area, with allowances made for time of sale, as well as factors such as location, improvements, zoning and soil quality. Injurious affection may occur where Hydro buys only part of a property. In such cases the effect on the remainder of the property that the owner continues to hold is determined. If the value of the remainder is found to be reduced, due to size and shape, effect on buildings and such, then compensation for that reduction in value (injurious affection) is added to the market value of the purchased portion in making up the total compensation.

Ontario Hydro employs appraisers on its own staff but also uses independent appraisal firms to supplement this service. On major projects, Hydro will have all properties appraised by its own staff. Independent

appraisers are retained to provide spot check appraisals as a comparison against the staff appraisals. The ultimate test of any appraisal occurs when it is presented in evidence before the Land Compensation Board. For this reason, appraisers closely follow the precedents set by this board as well as their own professional standards.

4.3.2.4 Compensation

The basis of compensation used by provincial government agencies in Ontario is spelled out in The Expropriations Act.(1) The entitlements of owners have been clearly set forth. No owner should be put in a position of financial loss as a result of action taken by any expropriating authority.

(a) **Easement**(12)

In the case of agricultural lands, the compensation formula recognizes the market value of the land, plus the impact of the transmission line on the farming operation. Under the formula, compensation for an easement is based on 75 per cent of the market value of the land to cover the basic right-of-way. To this is added an additional payment for any tower structures which will be required: compensation for the first structure is based on 75 per cent of the market value of one acre of land. This compensation is increased by 5 per cent for each additional structure. For example, compensation for the second structure is 80 per cent of the value of one acre of land, 85 per cent for the third structure and so on. Minimum payment for one structure is $100.

An owner can choose to receive an annual payment for the easement instead of a lump sum. The annual amount is determined by applying the chartered bank prime interest rate plus 1/2 of 1 per cent to the equivalent of the lump sum payment. For example, if the current chartered bank prime rate is 9 1/2 per cent, then the current annual payment will be 10 per cent of the lump sum value of the easement.

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The annual payment will be re-assessed periodically as follows: the interest rate to be used will be established on January 1 of each year after the initial payment. The value of the easement, based on the market value of the land, will be reviewed every five years. Thus, the annual payment will continue to be related to current land values and interest rates.

(b) Full Title (Purchase)

Sometimes both owner and Hydro agree that it is appropriate for Hydro to buy an entire property. This could apply, for example, where an owner's residence or main buildings are involved. It may also be appropriate in cases where most of the property is required and the remainder is too small to permit the owner to continue effectively in his normal operations, even with a licence to use the right-of-way. In such cases, Hydro would offer to sell the surplus property to the local municipal utility, municipality or Ontario Government agencies, sell it on the open market, or arrange an exchange with other affected owners.

If it is necessary to buy an entire property, requiring an owner to move his residence, allowances will be included in the offer based on estimates obtained covering reasonable moving and relocation costs.

The Act also makes provision for payment of other allowances such as disturbance, legal and survey costs, as applicable. In addition, Hydro recognizes the special impact which a transmission line has on a farm operation and is prepared to make an allowance for this disturbance. The allowance is related to market value of the required land.

4.3.2.5 Compensation Information

After the appraisals have been made, a separate staff of property agents call upon property owners to inform them of the compensation they may expect under the various options available to them. At this stage, Ontario Hydro is not negotiating for rights, but only informing owners of the amount they may expect to receive. This additional information is useful to owners in making a decision whether or not

to request a Hearing of Inquiry. It also gives them more time to consider the offer.

4.3.3 Expropriation Procedure

4.3.3.1 Application for Approval to Expropriate

As a first step in the expropriation process, Ontario Hydro must make application to the approving authority, the Minister of Energy, for approval to expropriate land rights. The application essentially consists of a list of the properties affected and, in the case of a limited interest (easement) expropriation, a description of the rights required.

4.3.3.2 Notice of Application

Following application to the approving authority, each affected owner will personally receive a "Notice of Application for Approval to Expropriate Land"(8). The "owners" of land, as defined in The Expropriations Act, include tenants, mortgage-holders, creditors with property liens and others with a legal interest in the property.

This notice sets out the specific property rights to be expropriated. It also tells owners how to request an inquiry into the proposed expropriation, if they wish.

To ensure that everyone with an interest in the affected properties is aware of the proposal, a copy of the notice is published in a local newspaper once a week for three consecutive weeks.

An owner who objects to the proposed expropriation may write to the approving authority designated in the notice, requesting an inquiry. The request must be filed within 30 days of receiving the notice.

4.3.3.3 Inquiry Hearings

A prime example of how The Expropriations Act(1) is designed to protect the interests of both the individual owner and the expropriating authority is the Inquiry Hearing (sometimes referred to as the Hearing of Necessity).

Essentially, the Act provides for: a hearing at which the individual property owner may make his

views known to an Inquiry Officer appointed at the request of the Minister of Energy, to establish whether the acquisition is fair, sound and reasonably necessary.

The Inquiry Officer reports to the Minister with a summary of the evidence, his findings and opinion on the merits of the application. Negotiations will not start until after the Inquiry Hearing.

4.3.3.4 Minister's Decision

After considering the report of the Inquiry Officer the Minister will either approve, approve with such modifications as he considers proper, or not approve the proposed expropriation.

4.3.3.5 Expropriation

Shortly after approval and while negotiations are continuing, Hydro will register a plan in the local registry or land title office which has the effect of transferring the property rights to Ontario Hydro.

Notice of the expropriation(9), together with a Notice of Election(10) and a Notice of Possession will then be delivered to each owner. The Notice of Election(11) gives the owner his choice of one of three dates he wants used in evaluating his compensation: the date he received his Notice of an Inquiry, the date the expropriation plan was registered, or the date he received this Notice of Expropriation. The Notice of Possession specifies the date on which Hydro requires access to the land concerned.

4.3.3.6 Offer of Compensation

If no agreement over price can be reached after a property has been expropriated, Ontario Hydro will offer each owner Hydro's estimate of full compensation for his interest in the land expropriated, and - except where the "owner" is a tenant - a statement of the total compensation being offered for all interests (such as mortgages) in the land. In addition, each owner will be offered immediate payment of 100 per cent of the market value of his interest in the land as estimated by Ontario Hydro, without prejudicing his right to have

compensation determined by subsequent negotiations or by the Land Compensation Board.

4.3.3.7 Arbitrating Compensation

The Province of Ontario has established a Board of Negotiation consisting of two or more members appointed by the Lieutenant Governor. Hydro or the owner can request the assistance of the Board of Negotiation, which will conduct a hearing, visit the property, and make a recommendation of what it considers adequate compensation. However, its recommendations are not binding.

If either party does not accept the Board's recommendation, the Land Compensation Board - also a government tribunal may be requested - to determine the amount of compensation. This amount, set by the board, if not appealed within 30 days, does become binding on both parties.

4.3.4 Station Sites

To this point the property policies and practices have been dealt with in terms of transmission line rights-of-way. The same policies and practices are applicable to transformer and generating station sites except that owners are not given the choice of Ontario Hydro acquiring full ownership or an easement in perpetuity. Ownership of the land in such cases is essential to meet the necessary standards of safety and security.

4.3.5 Multiple or Joint Use of Rights-of-Way and Sites

4.3.5.1 Urban Areas

Possible public uses of existing transmission line rights-of-way are constantly being investigated. In fact, many rights-of-way are being used for various purposes such as garden plots, golf courses, bicycle paths, walkways, subway access, parking material, storage, pipelines and railways.

Ontario Hydro cooperates with municipalities and government agencies in permitting rights-of-way and station site lands to be used for other purposes, such as parks, where feasible. For example, part of the area surrounding the Pickering generating station site is currently used by the Metropolitan Toronto

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and Region Conservation Authority and the Town of Pickering for recreation purposes. In such cases, Ontario Hydro makes a minimal charge for use of these lands and the municipality or park authority assumes the responsibility for normal maintenance. In the cases of commercial uses (such as car parking and material storage), Ontario Hydro cooperates with owners of adjoining land in enabling them to use its rights-of-way at prevailing local rental rates.

4.3.5.2 Agricultural Areas

The most common use of transmission line rights-of-way in rural areas is for agriculture, as in most cases former owners or owners of adjacent land want to retain or incorporate these lands in their existing farm operations. Nominal rents are charged for right-of-way lands as an inducement to keep them under cultivation. This keeps the acreage productive as well as lessening the impact on the area by the lines themselves. Constant liaison with the Ontario Federation of Agriculture, the National Farmers Union, Christian Farmers Federation of Ontario, and other farm groups helps promote the use of rights-of-way.

4.3.5.3 Other Uses

Where headponds were required in the past for the development of hydro-electric stations on major rivers, the necessary lands were acquired by purchase or expropriation, and residences and farm buildings were removed or relocated to higher ground.

Where feasible these areas are used for public recreation and in many cases, property owners have built cottages and homes beside these headponds.

4.3.4.4 Conclusion

In general, Ontario Hydro makes every attempt to be a responsible property owner and a good neighbour. Ontario Hydro is by legislation exempt from Municipal taxation. However, grants equal to full taxation are paid on all owned property. Hydro and its tenants also maintain the leased lands. Efforts are made to have Hydro property used in a manner conforming and fitting into the environment of the locality, and Hydro consults and cooperates with the Municipalities to this end.

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REFERENCES

	Title	Date
1.	The Expropriations Act	July, 1975
2.	Agricultural Licence	February, 1974/ January, 1976
3.	Acquiring Land for High Voltage Transmission Lines (pamphlet)	
4.	Field Practices (booklet)	December, 1975
5.	Property Acquisition Schedule	
6.	Information Letters	
	(a) Owners (b) Members of Parliament, Mayors, Reeves	
7.	Invitation Letter to Attend Meeting	
8.	Notice of Application for Approval to Expropriate Land	March, 1974
9.	Notice of Expropriation	March, 1974
10.	Notice of Election	March, 1974
11.	Notice of Possession	March, 1974
12.	Definition of Estate, Right or Interest Required	

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